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LIGHT ✂ HEAT ✂ POWER ✂ BYE-PRODUCTS

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PROPRIETORS: WALTER KING, LIMITED. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

Telephone: Central 6055. —— Telegrams: "GASKING, FLEET, LONDON."

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EDITORIAL NOTES.

A Fuel Council.

AMONG the subjects to which our responsible organizations must give immediate consideration is that of the position of fuel problems in this country. There is at the present time an amount of liveliness in this direction. Operations have been commenced in different places; and a widespread diversity of effort is being shown. In our issue for March 24 last (p. 742), we referred to the different *ad hoc* organizations which had been formed for the investigation of fuel problems. It was then remarked:

> We have now arrived at a stage where we hope that, owing to developments, a division of effort will not be detrimental to the good so far accomplished. An overlapping of investigation, instead of a thorough co-ordination, would undoubtedly contribute to uneconomy and inefficiency in the beneficial work in hand. . . . We look sympathetically on all these efforts; but, at the same time, we have a fear that, unless at once they are brought to a common centre, there will be, through overlapping of endeavour, a great deal of waste of energy, work, time, and money which might be better employed in the advancement of a common cause. Ultimately, there will be recognition that the sensible course would have been to come together *ab initio* for the general good, and such a course will be taken. . . . It is clear to us that each body of workers would have a strong pull in separate directions; pulling together, with a co-ordination and concentration of work, would have a more successful effect. Cannot a way be found for bringing this about?

Since those words were written in March last, there have been important developments, which are bound to issue in a more definite movement being made which will produce co-ordination and lead to every source of influence and information being a tributary to a common fund. The most imposing event of the past year in this connection was the appointment by the Government (acting on the suggestion of the Royal Commission on the Mining Industry) of the National Fuel and Power Committee. That appointment has entirely altered the aspect of matters in relation to the divided endeavour to deal with the complex fuel problems which confront us nationally and industrially. All organized effort has had its face turned towards the National Committee; and there now seems little room for question that, in some way, there will be a linking-up with the work of that Committee. A big influence in this direction will be Sir Alfred Mond, Bart., the Chairman of the Committee, who is also President of the Institution of Fuel Technologists. In this matter, there can be no question as to who shall be top-dog. In fuel problems, whatever the course of action, the cause is a common one, the interests are national. If there is now a top-dog, it is the National Fuel and Power Committee. The Committee may advise the Government to do this or that; but their advice must have fundamental knowledge and guarantee. Dealing with a subject of such magnitude and ramifications, the National Committee would be almost impotent without the co-operation of the industries; and the co-operation of the industries can best be secured through proper and representative organization. The work of the Committee will be greatly facilitated by such co-operation. On the other hand, it seems to us the work of the fuel technology organizations cannot be thoroughly effective without the assistance of the National Committee. Thus we can see that existing organizations are essential to the fullest advantage coming through the National Committee, and that that body is complementary to the work of those others

In view of this, it is necessary to go a step further; and the question to be decided is what is the best course to take in order to make the most effective use of all the organizations concerned. There has in the first place to be concentration of individual industries upon the utilization and application of fuel by them, and, in the case of the industries producing fuel, also upon the methods of use of what they produce in order to realize the highest practicable efficiency and therefore economy. The information, however obtained, requires to be dealt with by a body representative of the whole. Looking back at the paper which Dr. E. W. Smith read before the Glasgow Section of the Society of Chemical Industry in December [see "JOURNAL," Dec. 22, p. 762], we have a suggestion upon which to work. For some time, Dr. Smith has strongly felt that it would be of national advantage if a Federal Fuel Council were formed, representative of the institutions and research organizations concerned—viz., the Institution of Gas Engineers, Coke-Oven Managers' Association, Fuel Section of the Society of Chemical Industry, Institution of Petroleum Technologists, Institution of Fuel Technologists, Institution of Fuel Economy Engineers, Institution of Electrical Engineers, Fuel Research Board, Fuel Division of the National Federation of Iron and Steel Manufacturers, Fuel Division of the Federation of British Industries, Safety in Mines Department, and the Fuel Departments of the following Universities: Leeds, Sheffield, Manchester, Birmingham, and the Imperial College of Science. The primary function of the Federal Council would be to make joint representation on all matters where it is desirable, and to act in an advisory and co-ordinative capacity on request from sectional interests.

In the interests of co-ordination of, and really effective work on, our fuel problems—particularly with the national advisory Committee in existence—something of the nature outlined by Dr. Smith appears to be a paramount necessity; and in these fast-moving times, there should be no delay in dealing with the matter. We believe the question has been under the consideration of the Joint Committee of the Fuel Section of the Society of Chemical Industry, the Institution of Gas Engineers, and the Coke-Oven Managers' Association, and that, in the result, steps are being taken to bring it under the consideration of the various organizations and bodies mentioned in Dr. Smith's paper. We hope that discussion of the subject of the establishment of a Council will not take an inordinate length of time, because the position of fuel matters is such that, with the National Fuel and Power Committee in being, it will be of vast importance to have early an authoritative representative body who can speak and operate from the start of the work of the National Committee. It seems to us that the idea of consolidation of representation in this form, instead of the National Committee having to face and communicate with several floating units, is an absolute essential to current and future developments.

A Gas Company Acquire Colliery Interests.

A SHORT time ago a correspondent suggested in our columns that the gas industry should become possessed of its own collieries. As we then pointed out, it is not the first time that the suggestion has been made in conjunction with large gas undertakings situated near the coalfields. Now the interesting piece of news comes from Germany that the German Continental Gas Company—a large and enterprising concern—have purchased from a private firm big coal concessions in the Westphalian field, with mining works, and two coke-oven plants which have an annual output of gas of 1765 million c.ft. It is really more in the nature of an amalgamation, as part of the purchase price for the colliery interests and coking plants is being paid in shares of the Gas Company. The transaction is looked upon in Germany as something more than an ordinary commercial one. It is, for it brings into being at one move, going back long years, the vision of many men of the combination of interests from coal pit outwards, so that gas undertakings should become the chief fuel (solid and gaseous) suppliers in the towns and to industries. Here we have one concern now producing coal, metallurgical coke, gas at the coking plant, gas and coke at local manufacturing works, and liquid and other products at both the coking and the gas plants, with businesses established in important centres, carrying on trading direct from the colliery to household or factory. At the same time, the German Continental Gas Company have assured themselves of large supplies of raw material for gas-making purposes. The more one considers the development, the greater the possibilities appear.

Increase in Railway Rates.

A CYNIC has described life as being one (epitheted) worry after another. At the present time, he is not far wrong. No sooner have we reached the end of a seven months' coal stoppage, and begun looking forward to the day when coal supplies and prices will be at pre-stoppage rates, with industry gradually returning to a more prosperous state, than the Railway Rates Tribunal publish a decision which, the National Gas Council say, will prove very disappointing to the industrial community. With one or two minor exceptions, the suggestions of the railway companies have been accepted by the Tribunal. Following upon that announcement, the railway companies have given public notice of an increase (from the 1st prox.) of tolls, rates, and charges, which will be a new burden upon industry; and no one knows yet what has to be borne in the way of national taxation as a result of the labour troubles of last year. For merchandise in Class "A," the existing percentage addition of 50 p.ct. is to be increased to 60 p.ct. The existing flat rate addition of 3d. per ton and maximum addition of 4s. per ton are to remain unaltered. For coal and coke (except for blast-furnaces) the percentage addition of 50 p.ct. and maximum addition of 3s. 6d. per ton are to be increased to 60 p.ct. and 4s. respectively. The existing flat rate addition of 2d. per ton is to remain unaltered. For coal and coke for blast-furnaces, the existing percentage addition of 50 p.ct. and maximum addition of 2s. per ton are to be increased to 60 p.ct. and 2s. 6d. respectively. The existing flat rate addition of 2d. per ton is to remain unaltered. Merchandise in Class "B" is also to have the percentage addition increased from 50 p.ct. to 60 p.ct. The existing flat rate addition of 3d. per ton and maximum addition of 6s. per ton are to remain unchanged. Patent fuel is to have the percentage addition increased from 50 to 60 p.ct., and the maximum addition from 3s. 6d. to 4s. The existing flat rate addition is to remain unaltered. For blast-furnaces, patent fuel is to have the percentage addition of 50 p.ct. and maximum addition of 2s. per ton increased to 60 p.ct. and 2s. 6d. respectively. The existing flat rate addition of 2d. per ton will remain unaltered. Iron and steel and tin plates are to have the percentage addition increased from 50 to 60 p.ct. The percentage addition of 50 to wagon hire charges is to be increased to 60 p.ct. While it must be admitted that the railway companies have been badly hit, and that reserves and traffic receipts have suffered heavily, the increases are to be deplored, having regard to the circumstances in which the country finds itself. Anything which tends to increase the price of coal reacts not only upon the ordinary consumer, but upon industry generally, and prevents it regaining its full momentum.

From Electricity to Coal Carbonization.

THE news must have come as a shock to our electrical friends, last Friday, that Col. J. T. C. Moore-Brabazon, the Parliamentary Secretary to the Ministry of Transport, has resigned that office, though not his membership of Parliament, to take the chairmanship of Sensible Heat Distillation, Ltd., who, as our readers are aware, are the owners of the "L & N" process, with which the name of Mr. Harald Nielsen is identified as the inventor. As our columns have borne witness, Mr. Nielsen's technical studies and researches have been directed to developing a system of carbonization which will give a high production of a good primary oil, a readily combustible coke, and a yield of gaseous therms which is exceedingly good for low-temperature working. This is accomplished with the minimum thermal loss by the direct internal heating of the continuously flowing charge. Our interest in the translation of Col. Moore-Brabazon from the Parliamentary Secretaryship of the Ministry of Transport to the Chairmanship of the Company is due to the fact that he has been largely responsible for the work associated with the arduous task of piloting the Government Electricity Bill through Parliament, and his part in that gained for him well-merited encomiums. He is therefore passing from electricity to coal carbonization for oil, gas, and coke production; and he would not be doing that without very definite beliefs obtained from personal investigation. He sees approaching nearer day by day certain definite problems for this country—one is the production of oil from our own resources, and another the utilization of our coal resources to the best advantage, accompanied by the provision of a solid smokeless fuel. Col. Moore-Brabazon's association with aviation and his work at the Ministry of Transport have convinced him of the imperative need of this country not to rely solely for oil and motor spirit upon overseas sources. In him the Sensible Heat Distillation Company will have a good driving force and power, and coal carbonization a recruit who will render it invaluable service.

Report of the Fuel Research Board.

THE report of the Fuel Research Board for 1925, signed by Sir Richard Threlfall (the Chairman), and that of the Director of Fuel Research (Dr. C. H. Lander) for the same year, are both dated July, 1926. It is not until January, 1927, that publication is made, which indicates that between the reasonable date the documents were presented and the time they are published, there has been a lag in the printing and issue which gives the impression that the contents are somewhat ancient history. There may be good reason for the delay; but whatever it is, it inflicts an injustice upon the work and its technical value, because much more research has been carried out since Dec. 31, 1925, and new findings have to be added to those recorded. The reports cover a large field of operations. There has been ability to extend exploration owing to additional funds enabling an extension of laboratory accommodation and an amplification of staff; and good use has been made of the happier conditions.

The importance of the survey that is being made of the coal areas cannot be overrated. The work has been extended from the Lancashire, Cheshire, and South Yorkshire fields to the Scottish, North Staffordshire, and Nottinghamshire and Derbyshire districts. It is a big, but valuable, work that the Board have undertaken here. Hitherto large users of coal in their purchases have only had empirical guidance and (where made) their own analysis of coal. But nothing directional has been available from independent authority. We can agree with the remarks of the Board that the importance of methods of sampling and analysis of coal is being increasingly realized, and may have a far-reaching bearing on our export trade. Foreign buyers are becoming more critical

as to the quality of coal supply, and are more and more inclined to purchase to a specification. Foreign coal producers are alive to this tendency, and are taking full advantage of it. We believe that, with the growing concentration on fuel problems, we are approaching the time when buyers will want to have more exact knowledge of the coal they are buying, and will insist on having what they require. The technical survey which is being made will, when there is a complete sifting out and compilation of the data obtained, be of inestimable value both to the coal industry and to the users of coal. At the same time, we anticipate that the information which will be accumulated will be more or less general and approximate, because we know how coal varies between colliery and colliery, and between seam and seam in the same colliery, and how the qualities of coal change with the output life of a pit. Thus it will always be necessary not only to have the data which are being collected by the survey, but to continue to keep guard over deliveries of coal by works analysis.

A large part of Dr. Lander's report is devoted to low-temperature carbonization; but the position as revealed by 1925 has not altered much. The work that was then proceeding was largely confined to the attempt to develop continuously working metal vertical retorts, with the object of obtaining good lump coke suitable for domestic use, and at the same time the maximum yield of oil-producing tar. But there were distortion difficulties, which, of course, obstructed smooth working. Nevertheless, useful information was obtained; but a desideratum is a special metal for these retorts which will not warp or distort. Low-temperature research has been proceeding for a considerable time at the station for the purpose of exploring all possibilities; and apparently it will have to go on much longer, inasmuch as in this report we read: "A few weeks or months may be sufficient to prove that "a plant is not commercial; some years are necessary to "give the proof that it is really satisfactory."

As to high-temperature carbonization, great interest has been aroused in the gas industry by the experiments on the injection of oil into vertical retorts during carbonization. Various gas undertakings have been making trials of the idea, in order to ascertain the commercial practicability of this plan of affording greater elasticity to the working of verticals. The therm effect with certain coals is alluring; and another interesting consideration is that the system tends in some respects to yield products akin to those generally associated with low-temperature carbonization. But further research is required before definite statements can be made. We know that this work is looked upon as most promising; and it is hoped that we shall hear more of developments in investigation along these lines at the Fuel Research Station. The latest information available was contained in an article describing a visit to the station which was published in the "JOURNAL" for Nov. 3, p. 301, when several other matters, which are being explored, received reference. Interest will also be engendered in new directions with the completion of the horizontal retort plant at the station.

Among other points noted in the report is an allusion to the marked reduction effected in the heat losses of the vertical retort setting by the application of West's insulating bricks; and there is a hint that ironwork should not be embedded in the insulating material, as a great drain of heat results. Those who are working on the effects upon production of the physical condition of coal charges, must give credit to the Research Station for the investigation that was being conducted there in 1925 on the use in continuous vertical retorts of graded coal—such as Mitchell Main gas nuts. It was found that the nominal throughput could be considerably increased, though, as was expected, difficulties arose when attempting a similar throughput with a run of coal containing a substantial proportion of fines. When the graded coal was being used, with the throughput doubled, the coke produced was more free-burning than ordinary gas coke, and was rather of the nature of a mixture of high and low temperature coke. The gas yield per ton, however, was reduced; but the yield of tar (of lower density and viscosity than ordinary tar) was materially increased. But more extended and definite information, for the assessment of possibilities and the determination of the characteristics of the coke and tar, has yet to come from the station. The paper which Mr. T. F. E. Rhead submitted at the last meeting of the Institution is worthy of study in this connection, dealing as it did with the same subject, and showing, using continuous vertical retorts, much the same general conclusions. On the same occasion, the Sixteenth Report of the Gas Investigation Committee also dealt with the influence in carbonization of size of the particles constituting the coal charge, but in a horizontal retort.

Expectation of interest in another direction is aroused by the information that arrangements have been made for suitable accommodation to be provided at the new Building Research Station near Watford, to enable experiments to be carried out on the various problems associated with domestic heating. This affords a large scope for work. Measurements will be made of the heat losses from different heated interiors, through various types of wall and roof construction. Investigation will also be made of the effects of meteorological conditions on these losses.

Though the report is belated, it shows that the work undertaken by Dr. Lander and his staff is being carried into new fields; it reflects the care with which investigation is prosecuted; and it reminds us that the services of the Director and his staff have, particularly during the inquiry by the Coal Commission, had to be diverted from research to other matters of national importance.

Co-partnership the Way to Industrial Peace.

IT has been observed that some of the principal leaders in the trade union world are now favourable to the employees in industry and trade becoming co-partners, and sharing in the responsibilities of direction. Among them is Mr. Frank Hodges. In an address to the London Commercial Club last week, he dealt with the question, "Can Industrial Relations be Improved?" He believes they can, if we go to work in the right way. In developing his thesis, he said there must be the will to good relations, not only in industry generally, but beginning where he thought it must begin—in the workshop. The difficulty is to get any initiation in this respect from workshops where improvement in relations is most desirable. Workshops are not as a rule manned by intellects of one good standard; and what is frequently found (there are, of course, exceptions) is that, when a master approaches his men with some scheme to promote goodwill and to give them a greater interest in the industry, they look upon the proposal dubiously, say they must refer it to their local union leaders, and the local union leaders refer it in turn to those who sit in the seats of the mighty in the upper trade union conclaves. And those conclaves are not as they were, since the Communist element has obtained in them such a loud voice and strong leverage. In such circumstances, the divorcement of industrial employer and employee is complete. There is, too, by some unions autocratic and dogmatic treatment, often suspicion, and a refusal to do those things which, though beneficial to the men, may not be in strict consonance with trade union canons or policy. Those canons or policy are regarded as unalterable, and not subject to the changing conditions of the times. While that is the case, there can be no evolution along correct lines. There is also the fear that what is proposed might, if effective in promoting the personal interests of the men, prove also effective in undermining the power of the trade unions. But with that we do not agree, if their power is exercised for the good of industry generally, and therefore of their members. It is a complex matter—more complex than Mr. Frank Hodges in his address recognized. While the spirit and the will must be created in the workshop on the one hand, it cannot be done unless the trade union leaders give the effort their blessing; and, before they can do that, they must create the will and the spirit within their own governing bodies. If it was only a question of dealing in this matter with men as leaders all of the stamp of Hodges, Thomas, Clynes, Thorne, Henderson, Cramp, and others we could name, a vastly different state of things could and would be brought about. But unfortunately it is not so.

However, it is hopeful to hear Mr. Hodges say: "That "industrial relations could be improved is not merely "a hope, but a fact. That they must be improved is im-

"perative." We sincerely concur. We are not with those who say that trade unions should be destroyed. "Trade unionism," observes Mr. Hodges, "in its best sense, is an orderly, disciplined, useful economic institution." But those things do not prevail "in the best sense" in all the trade unions; and it is because of that we have the barriers to a new order of conditions in the relations (where they are not already good) between employers and employees. If trade unionism had not drifted from "an orderly, disciplined, useful economic institution," it would be an easy thing to endorse Mr. Hodges' view "that trade unionism can be used to help business to become stable. It is an instrument which employers could use for the elimination of certain disturbing elements within their own ranks. It is essential that the employing mind should see that trade unionism must not die, but must grow." Again we agree, providing the growth is in the right direction. But what is the fact? Trade unionism has grown, but in manner which has clothed it with the power to be more militant, and in many unions policy has moved along the lines dictated by the new elements in trade union authority, and those elements are serious obstacles to the attainment of the aspiration of Mr. Hodges to the collaboration of trade unionism in the work of enabling business to become more stable. In the interests of their members, no better work could be undertaken by the unions. But they can never operate effectively until they set their own houses in order by eliminating those whose policy is destructive of the right will and spirit, and not constructive in the common interests of all engaged in industry. Mr. Hodges recognizes that there must be a working together. Such united action is the thing against which the extremists are plotting and working. If a cordial co-operative system of relationships could be brought about, there would be no difficulty in many industries in working-out a definite agreement regarding the distribution of the net proceeds.

It is fundamental to progress in improving industrial relationships—having secured the right will and spirit among both the men and their leaders—that the framework should be so fashioned "as to allow the workmen to have more than a mere wage interest." Almost precisely the same words were used by Sir George Livesey in the early days of co-partnership in the gas industry. The advantage has been proved; and so has the final recommendation of Mr. Hodges that the men should, wherever possible, have their own elected representatives on the boards of directors. Industries are seeing things in a new light; and it is well known that these proposals for new relationships have been tried and have not been found wanting in the gas industry. It is a wise and orderly form of constructive industrial evolution; and we are glad such leaders as Mr. Hodges recognize it as such.

Amending Gas Legislation.

The Board of Trade have submitted their views to the National Gas Council on the Memorandum regarding this subject, as published in the "JOURNAL" for Oct. 6, p. 25. To consider the views of the Department, the Central Executive Board have appointed a representative Committee.

Synthetic Nitrogen.

It is reported that the estimated production of synthetic nitrogen in Germany last year was 650,000 tons, against 480,000 tons in the previous year.

Coal Output.

During the week ending Dec. 18, the output of coal in Great Britain was 4,878,900 tons; and the number of persons employed was 925,400. In the week ending Dec. 25, the output was 4,651,500 tons; and the number of employed 945,400. In the week ending Jan. 1, the production was 3,884,200 tons, and the number of employed 952,400.

Tar Specification for Road Surfacing.

We have not yet arrived at the point at which it can be said that an acceptable tar specification for road purposes has been formulated. Probably as the result of the discussion at the recent Tar Conference, further consideration has been given by the Joint Tar Committee to the new draft specification; and they (according to the minutes of the Central Executive Board of the National Gas Council) have unanimously agreed that it would be in the interests of the producers and users of tar alike to avoid any hasty conclusion. The Committee have therefore withdrawn the specification already submitted to the Central Board, and have appointed a Technical Sub-Committee, representing gas and coking interests and the tar distillers, to review thoroughly the whole position. That is a wise course.

Coke-Oven Gas for Town Supply.

Reference was recently made in our columns to what is taking place in Germany in connection with schemes for collecting coke-oven gas and transmitting it long distances for supply in bulk to cities and towns. It is understood that the Ruhr coal owners are not quite comfortable in their minds as to the financial result of doing this. There appear to be no technical difficulties; but the question is entirely one which must be considered from the financial point of view. Naturally gas undertakings would not abandon their present manufacturing systems unless assured that now and prospectively they would receive coke-oven gas at a price below the net cost at which they can themselves put gas into their holders. As against this, the owners of the coke-oven plants have to consider the question of capital and maintenance costs for the transmission lines and plant. It is calculated that a pipe-line from the Ruhr to Berlin, with the accessory plant, would entail an outlay of between £2,500,000 and £2,750,000. The question they are pondering is therefore, Will it pay?

Asking for Trouble.

There is before us a copy of a letter sent by the Assistant Clerk of a local authority, in the middle of December, to contractors associated with the gas-supply industry. For impertinence and cupidity, this communication is one of the worst that has been seen for some time. The writer of the letter states that he would "feel very thankful" if the recipient of his letter would be good enough to send to him, or place his name on the firm's list for, one of their pocket books, diaries, calendars, pen-knives, pencils, fountain pens, treasury notes, cases, or any other souvenir for 1927 which the firm may be issuing this year. The embodying of "treasury notes," or even treasury note cases (if that is what he really means), among the less important items suggests craftiness of no mean order. Doubtless treasury notes would be "cherished" more than any of the other articles "as a token of business relationship, with a hope of further extension or development of same during the coming new year." This cunning gentleman thanks "in anticipation" the recipient of his communication, which thanks, at any rate in one case, are misplaced. He also wishes them the compliments of the season. That he does not desire his superiors to know he has sent out this begging communication is evidenced by the fact that he asks the firm kindly to send their reply to his private residence, the address of which he supplies. We should imagine that if the assistant clerk's communication was forwarded to the members of the local authority he would, at an early date, be looking round for another job.

General Strike and Railway Funds.

Reference has been made in our columns to the decision of the Executive of the National Union of Railwaymen to make an additional levy of 3d. per week upon the members for the purpose of rehabilitating the funds of the Union, which, through the events of last year, have been so seriously depleted. The "Railway Review" is the organ of the "N.U.R." It states that at the end of 1925 the Union had at its disposal in the general fund £727,019. This fund is the source from which are paid the administrative expenses, and unemployment and strike pay. During the past year the Union has distributed £1,750,000 in strike and unemployment pay. The "Review" says: "This means that the general fund has been overspent by the sum of £1,000,000, and that the accident fund, the disablement fund, the head office employees' superannuation, and other funds, with the exception of the orphan fund, have

been mortgaged to meet the calls for unemployment benefit for members. There is no money but the weekly income of the Union to meet the daily calls for members' assistance. Last week, for the first time since May, the Union received more money than it paid out. It is to re-establish the funds that have been pawned to pay members' unemployment that the levy has been made."

The Unemployed.

The total number of persons on the registers of the employment exchanges in Great Britain on Jan. 3 was 1,495,800. This was 144,755 more than in the previous week, and 244,094 more than a year ago. Of the total, 434,200 are temporarily unemployed, as compared with 375,002 in the preceding week, and 274,644 in the corresponding week last year.

PERSONAL.

As was anticipated, there has been a general expression of satisfaction throughout the gas industry regarding the honour conferred by His Majesty upon the President of the National Gas Council, and Governor of the Gas Light and Coke Company. One of the most happy incidents has been that, at the Manchester Regional Council of the Employers' Federation, the workers' representatives proposed a message of congratulation to Sir DAVID MILNE WATSON. We also see that resolutions to the same effect have been passed by the Central Executive Board of the National Gas Council and the Federation of Gas Employers.

Mr. CHARLES WOOD, O.B.E., the Engineer and General Manager to the Bradford Corporation Gas Department, who has suffered a rather severe attack of neurasthenia recently, and is now recuperating at a nursing home on the South Coast, is reported to be progressing favourably, and is likely to leave the home in about three weeks, though it may be a little longer before he returns to duty at Bradford.

Messrs. E. J. KING and W. H. HANDLEY have been appointed Joint Managing-Directors of Messrs. Robert Dempster & Sons, Ltd., in succession to the late Mr. J. W. Broadhead; and Messrs. C. T. JACOBS and H. J. TOOGOOD are to have seats on the Board of Directors.

Mr. STANLEY H. L. MUGFORD, who served his articles with Mr. F. Chalmers, Engineer and Manager of the St. Mary Church Gas-Works, Torquay, of which he was later Assistant Manager, has been appointed Engineer's Assistant to the South Metropolitan Gas Company.

Mr. HERBERT WILDE, of the Bradford Gas Department Showrooms, Hon. Secretary of the West Riding of Yorkshire Gas Salesmen's Circle, and Hon. Treasurer of the Yorkshire Junior Gas Association, was on Jan. 11 elected Hon. Secretary of the Bradford Publicity Club, of whose Council he has been a member practically from the inception of the club.

We learn from Mr. R. W. BROADHEAD that, in view of the recent change (following the death of Mr. J. W. Broadhead) in the management of Messrs. Robert Dempster & Sons, Ltd., of Elland, which has been effected through the Chairman of the Company (Mr. Charles Dempster), he has resigned his position of Assistant to the Managing-Director, and severed his connection with the firm.

The Home Secretary has appointed Dr. J. C. BRIDGE, F.R.C.S. (Edin.), one of the Medical Inspectors of the Factory Department, to the post of Senior Medical Inspector of Factories which was vacated by the resignation of Sir Thomas Legge.

OBITUARY.

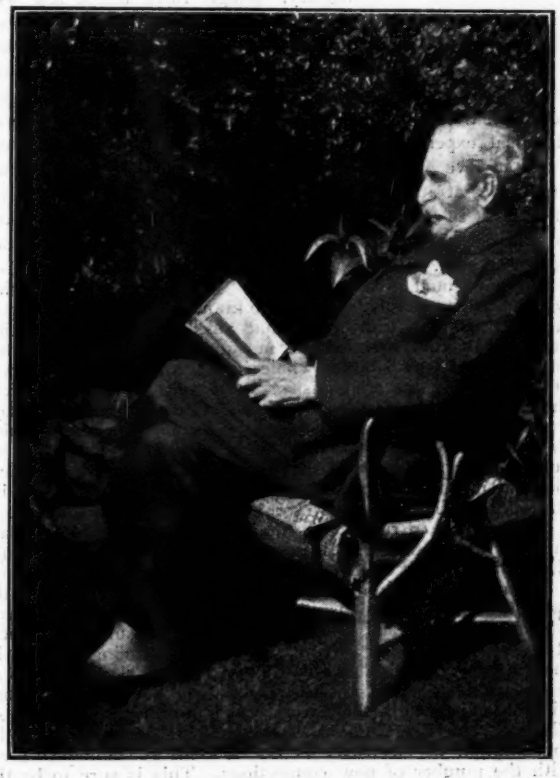
DANIEL IRVING.

It is our painful duty to record to-day a loss to ourselves and to all who knew him, through the death of Mr. Daniel Irving, which occurred on Jan. 12, at his residence, 2, Priory Road, Tyndall's Park, Bristol, at the age of 71 years. He leaves behind him many friends, and a record of good work for the industry to which he was so completely devoted.

Mr. Irving was a native of Carlisle, where he received his training, under the late Mr. Joseph Hepworth, who was for many years Engineer and Manager of the gas and water undertakings of that city. After seven years there, during which he received a training that was in every sense practical and thorough, he was appointed Engineer and Manager of the Maryport and District Gas-Works; and in 1888 he resigned this position in order to go to Bristol, to become Engineer of the Company's Stapleton Road Works. In Bristol he spent the remainder of his life, ever increasing his circle of friends, among those connected with his industry and persons outside it. He retained his position at the Stapleton Road Works until 1901, when, on the retirement of Mr. William Fiddes, the Directors of the Bristol Gas Company recognized Mr. Irving's ability and his devotion to his work by appointing him Chief Engineer.

To the regret of all connected with the Company, in whose service he had been for no less than thirty years, health considerations led him in the latter half of 1918 to retire from this position, in which he was succeeded by Mr. R. Robertson, who happily continues to carry on the good work. Mr. Irving's retirement was shortly afterwards the cause of a gathering of the officials of the Company, when the Secretary and Commercial Manager (Mr. S. E. Hafliwell) asked his acceptance from the staff of a silver rose-bowl, as a souvenir of his long service with the Company, and a tangible expression of their good wishes. And if affection existed on the one side, no less did it exist on the other; for Mr. Irving loved his work, and all connected with it. During his Engineership he inaugurated great improvements in the plant, and carried out a vast amount of constructional work; and he was proud—and justly proud—of the undertaking. It is but a very short time since the writer had the pleasure of going over the Stapleton Road Gas-Works in the company of Mr. Irving, whose every word testified to this pride and to his undiminished love for the works with which he had had so long an association.

In 1884 Mr. Irving became a member of the Gas Institute, on the Council of which he subsequently served. In the activities of this body he took a keen interest; and in 1895 he contributed to the proceedings a paper on "Unaccounted-for Gas," for which he received the first prize, with the President's medal. Deservedly, he progressed in office, and ably fulfilled his duties, during the session 1904-5, of President of the Institution of Gas Engineers (which the Gas Institute had then become); his address at the annual meeting on that occasion being eulogized by Mr. A. F. Browne and Mr. G. C. Trewby. Sir George Livesey also spoke on the address—pointing out that the President had omitted one outstanding fact, owing probably to his great modesty. "One of the most important innovations of



DANIEL IRVING, M.Inst.C.E.

late years with regard to gas regulation," said Sir George, "was brought about by the Bristol Gas Company in 1891, when they introduced the system of the conversion of 10 p.ct. stock

into a double amount of 5 p.ct. stock—an act of justice and wisdom which had been largely followed." This remark emphasizes both Mr. Irving's unassuming character and the progressive nature of the undertaking which he served.

Mr. Irving acted as President in 1892 of the South-West of England District Association of Gas Engineers, which was afterwards amalgamated with the Southern Association; and in 1900 he became President of the latter body—again delivering an address characterized by sound and broad-minded views. Those who were present at the meeting in November of the Southern Association heard with great regret that illness prevented Mr. Irving from attending in person to receive the commemorative medallion which had been prepared for him, as well as for other Past Presidents. Among his various other activities, Mr. Irving also filled the office of President of the Bristol Association of Engineers, of which he was an original member; and he served as President of the West of England and South Wales Branch of the Institution of Civil Engineers. In 1904 he was transferred to full membership of the Institution of Civil Engineers. It may be remarked that, in connection with the Earl's Court Gas Exhibition of 1904, he did an immense amount of work, for which there was ample reward for him in its successful outcome. All privileged to know him will long remember his skill, his sound judgment, and his kindly nature.

In 1923 Mr. Irving had the misfortune to lose his wife, who passed away after an illness which had extended over some little time. To his sons in the gas industry—Mr. Douglas F. Irving and Mr. Roy F. Irving—and the other members of the family, heartfelt sympathy is extended.

THE FUNERAL.

At Redland Grove United Methodist Church, Bristol, where Mr. Irving and his family worshipped for many years, the funeral service took place on Saturday. It was conducted by the Rev. E. C. Urwin, M.A., B.D., Minister of the church. Simple in character, it was deeply impressive throughout. Before the cortège entered, music on the organ was rendered with great feeling by Mr. C. W. Casley.

The principal mourners were Mr. Douglas Irving (elder son), Mr. and Mrs. Roy Irving, Miss Irving (daughter), Dr. and Mrs. Bodman (daughter), Miss Irving (sister), and Dr. Irving (brother). The presence in the church of a large number of friends who had been associated with Mr. Irving in various phases of his life's work bore testimony to the high regard in which he was held. There were many beautiful floral emblems. Representing the Bristol Gas Company were the Chairman (Sir George E. Davies, J.P., Past President of the British Commercial Gas Association), the Vice-Chairman (Alderman J. Fuller Eberle), the Works Manager and Engineer (Mr. Robert Robertson, who also represented the Southern Association of Gas Engineers and Managers, as Immediate Past-President), the Deputy Engineer (Mr. O. J. Preston), the Secretary and Commercial Manager (Mr. S. E. Halliwell), the Assistant Secretary (Mr. A. Edbrooke), the Distribution Superintendent (Mr. Jones), and the Superintendent of the Stove Department (Mr. Conway). On behalf of the Institution of Gas Engineers, the Secretary (Mr. Walter T. Dunn) attended, representing also the Evening Star Lodge of Freemasons, of which Mr. Irving had been a member for a number of years. Lieut.-Col. Hunter and Mr. Royce were present from the Bristol Homœopathic Hospital, which enjoyed the advantage of Mr. Irving's invaluable and unfailing help as Chairman of the Board of Management.

The service at the church concluded, there followed the last sad journey to Canford Cemetery, some few miles away. With the winter sun shining on the peaceful country scene, we left our friend at rest, memories remaining of a long full life, with its many purposes valiantly achieved.

The death occurred on Jan. 2 of Mr. FREDERICK ARTHUR SEARLE, the Borough Treasurer of Bideford, who for twenty years was connected with the Board of Directors of the Bideford Gas Light and Coke Company, during fifteen of which he acted as Chairman. At the meeting of the Company on Jan. 6, a vote of condolence and sympathy with the widow was passed, and reference was made to the keen interest Mr. Searle took in the welfare of the Company. In addition to his official position of Borough Treasurer, he took a lively interest in the affairs of the district, and was a warm supporter of all local educational work. Our readers will regret to hear that Mrs. Searle, who was taken ill on Jan. 10, is in a dangerous condition.

ELECTRICITY SUPPLY MEMORANDA.

THE optimistic note as to what 1927 will bring to the electricity supply industry continues to be sounded in the views which "Electrical Industries" has secured as a result of a circular inquiry, though there are a few who are suspicious that those who look for a rebound from the events of last year to a maximum prosperity are allowing their expectations to exceed rational limits. There must be a little time for righting things before a boom. The veteran electrical expert, Col. R. E. Crompton, who is not very much in love with the new Electricity Supply Act, is inclined to think that its passing will be followed by a great revival of interest in giving electricity supply to the rural population. But he says that this, to be successful, must be furnished at a low rate. We are not aware of the interpretation Col. Crompton would give to the term "low rate" in connection with electricity supply. But we do know that this distinguished engineer has full knowledge that any savings in generation produced by concentration will not find expression at the other end of a long distribution cable in a rural district, but will be absorbed in the transmission costs and losses long before the energy reaches its journey's end. Col. Crompton also says the industry will have to consider ways and means by which the rural population can have their installation work carried out for them at a lower cost than has hitherto been attempted, and possibly on terms of deferred payment. To get good installation work, we cannot see how it can be carried out at a cheaper rate in rural areas than has hitherto been the case in cities or towns. The idea seems to be incompatible with circumstances. It is to be hoped that, if there is any attempt to cheapen installation, the quality will be better than is the case in many of the installations which already exist, and which many electrical men are aware are a standing menace. It is hoped that the wiring, hiring, and trading powers in the Electricity Supply Act will cause municipal authorities to ensure that something better than much of the former work will find existence in their areas. It is noticed that Mr. R. A. Chattock, of Birmingham, says that, in his experience, the consumption of electricity is not increasing commensurately with the number of new connections. This is sure to be the case as a new stratum of consumers is tapped. We have no doubt, too, that many electricity concerns are finding that the old ratio of consumption to capital expenditure per consumer is suffering from the low order of individual patronage that is now being secured.

The Benighted Areas.

The Electric Market Place.

In an article in the "Electrical Review," Mr. Herbert H. Berry outlines a vision of the future establishment of centrally situated electrical "market places" throughout the Kingdom. Apparently his idea is that the showroom which looks so much like a shop outside shall be discarded, and that, by co-operative effort and financial responsibility, electricity suppliers, contractors, and others interested shall have something to aid in the development of electrical trading that is a popular step in advance of the showroom. Showrooms have developed in lay-out and attractiveness in a remarkable manner; but that, of course, is no reason for assuming that they represent the last word in the demonstration form of propaganda. Using Mr. Berry's own description of what he has in mind, he says: "My vision is that there shall be created in every city, town, and village in the country, an electric house or electric market place centrally situated, and built on a 'common plan.' The standard plans, varying in size according to the population of the town or village, will be approved by a Special Committee representing the interested parties. The electric home atmosphere once created, with an adequately equipped lecture and demonstration room, what could be more fitting than that the Electrical Development Association should arrange a 'circuit' for lecturers and demonstrators, drawn doubtless, to a large extent, from the manufacturers' and other associations vitally interested in the economic furtherance of electrical propaganda? Local electrical contractors will co-operate with the resident engineer in an endeavour to crowd the building with their actual and prospective customers." In Mr. Berry's opinion, the results will be so far-reaching that the Government estimate as to the increase in current per capita during the next ten years will be found to be greatly under-estimated. He also thinks that nothing can now prevent an immediate expansion in the volume of business; but the rate of progress will be slow without co-ordinated effort.

To Regulate Exhibitions.

In another part of his article, Mr. Berry deals with the subject of the co-ordination of local exhibitions. These are a great burden upon manufacturers when the appetite for them is on the grand scale; and, as a matter of fact, they sometimes hardly know how to keep pace with the demands upon them. The electricity industry has now formed a strong Electrical Exhibition Committee, to whom all applications for displays will be referred. This Committee will operate in conjunction with the Electrical Development

Association, and will deal with all matters appertaining to twelve classes of electrical exhibitions—ranging from the Wembley type down to minor local and travelling shows. When an electrical undertaking is contemplating the holding of an exhibition of whatever magnitude or class, preliminary inquiries and proposals will have to be sent to Mr. J. W. Beauchamp, Director of the "E.D.A." Mr. Berry is Chairman of the Committee; and he invites constructive suggestions in any shape or form. One idea of this organized arrangement of exhibitions is to avoid overlapping, so that there can be transference from one locality to another, as is deemed most expedient. We all know that the haphazard methods of exhibition propaganda, as practised in the past, were wasteful; and we cannot help agreeing with our electrical friends that by co-ordination much waste could be avoided. It is also felt that, by the same expenditure as formerly, a much more beneficial result could be achieved by proper arrangement.

Misbehaviour.

There is no question that electricity supply has enlarged the variety of incidents of daily life. During the last few weeks, we have recorded several cases of failure of supply of current. The uncertainty of continuity or failure is one of the characteristics of the supply which most people depending upon it regard with disagreeable feelings; while they should acknowledge that it provides a change from the monotony of daily life. One never knows when or where the next failure will occur; whether it will be general in a locality or merely affect an individual consumer. The news was broadcasted last Saturday week that the electricity supply had failed at Ashby-de-la-Zouch and Coalville, and that the residents were flitting here and there in search of the primitive candle to enable them to obtain artificial light. The freakish current was absent for about an hour. Why Ashby-de-la-Zouch and Coalville should have been favoured with a broadcast of this event in their communal life, we do not know. Much more important places have suffered similar failures, without the whole country being informed. Last week we recorded that Manchester had experienced a stoppage during the "sales" season. The citizens had further excitement provided by electricity on Jan. 10. An electric newspaper sign which overlooks Corporation Street at its junction with Market Street was set on fire by a short circuit; and this drew a tremendous crowd of sightseers at the inconvenient centre. The fire brigade turned out. The main fuses were removed, in order to prevent any chance of a shock while the firemen were engaged on the sign. The lamps and wires were destroyed, and two adjacent newspaper signs were also involved. The public interest in the occurrence was reflected by the notice the newspapers thought fit to take of it. Halifax had a little sensation last Wednesday night while a cinema performance was proceeding at the Victoria Hall. The electric sign at the front entrance was found to be ablaze. The audience was asked by the Manager to leave the hall quickly and in an orderly manner, which they did, probably with in mind visions of the terrible catastrophe elsewhere of which the newspapers had given due prominence. The Fire Brigade promptly dealt with the trouble. Recently there was a slight outbreak of fire at St. James' Palace, which was attributed to defective electric wiring. It is stated that renewal of the wiring, and improvement of the fuse-boxes, are contemplated. Electrical contractors no doubt hope that other electricity users with depreciated installations will follow the proposed example of St. James' Palace.

Big Schemes—Birmingham.

Now that the Electricity Bill has become law, there is considerable activity among the large corporations of the country in relation to the extension of their generating plants. They all appear to be anxious to be the possessors of large super-power stations (which will be of the elect under the new scheme), notwithstanding the control by the Central Electricity Board in respect of technical management and dealings with the energy generated. It is interesting to note that much of this new work is being pushed forward, through the Electricity Commissioners, before the appointment of the Central Board; and therefore they will have no voice in these particular important developments in which they will be intimately concerned. A few notes may be of interest regarding movements in this respect. The Birmingham Corporation have accepted a tender by International Combustion, Ltd., for the first section of the new Hams Hall super-power station. It is stated that this contract has an initial value of £1,458,000. The civil work covers the preparation of site, levelling, piling, mass concrete foundations, steel-framed buildings for switch-house, turbine-house, and boiler-house; it also covers workmen's dwellings, reservoirs, railway sidings, locomotive sheds, and levelling of the coal-storage site. This, together with the cooling towers and coal and ash handling plants, has been sub-contracted to the Mitchell Conveyor & Transporter Company, Ltd. The turbo-alternators, each of 30,000 KW. capacity, the house generators of 1500 KW. capacity, also all switch-gear, transformers, and motor generators, as well as the condensing equipment, will be supplied by the General Electric Company, Ltd., to whom the whole of this section has been sub-contracted. In the boiler-house, five of the largest water-tube boilers yet constructed in this country are to be installed; each having an evaporative capacity of 200,000 lbs. per hour. The working pressure of the boilers will be 375 lbs. per sq. in., and they will operate with pulverized fuel firing equipment, all of which will be manufactured by International Combustion, Ltd., to the well-known "Lopulco" patents. The "Lopulco" water-cooled furnaces will form an important feature of the steam generating equipment; and air heating by means of the "Usco" plate-type air-heater will be used throughout in connection with the preheating of the air for combustion.

Bradford and Leeds.

Turning to Yorkshire, it is seen that the Bradford Corporation are proposing (on the advice of their Electrical Engineer, Mr. Thomas Roles), to enlarge their Valley Road station, and to erect there a boiler-house to contain extra-high-pressure plant—1100 lbs. per square inch. The estimated cost is £80,000. The Electricity Commissioners have also approved a scheme which includes the provision of a new 20,000 KW. turbo; and it is calculated that the whole work will cost approximately £300,000. At the present time, the consumption of coal at the works is 80,000 tons per annum. When the new plant is in operation (it is expected to be completed by March, 1928), it is anticipated there will be a saving of no less than 12 p.ct. in the consumption of coal. Assuming that coal can be obtained at 16s. per ton, the monetary saving (assuming anticipations are fulfilled) will be upwards of £7700 per annum. It is hoped that with the new plant a thermal efficiency of between 24 and 25 p.ct. will be realized, compared with the less than 17 p.ct. at Valley Road at the present time. If there is success, the efficiency will be higher than that of any existing generating station in the country. The Valley Road generating plant as now in being is equal to 64,000 KW. (maximum continuous rating). The plans will increase it to 91,500 KW.; and it can, if necessary, be extended to 107,500 KW. It is also estimated that the new plant can be installed at a cost of £11 per KW.; whereas, had a new station been erected, the cost would in all probability have been in the neighbourhood of £14 per KW. With little augmentation, the same staff will be able to operate the additional plant. Reports in the local papers assert that the scheme ensures Bradford's electrical position for years to come; but, of course, this will be subject to the decisions ultimately of the Central Electricity Board. Turning to Leeds, the Corporation have proposals in hand for the construction of a new station on a very large scale; but the scheme, it is understood, has not yet been submitted to the Electricity Commissioners. The site for the works, it is stated, is near the River Aire, between Kirkstall Road and Armley; and the ultimate cost of the scheme is likely to be 2 millions sterling. The first instalment, however, is estimated to cost £865,000, which covers two 50,000 KW. units, with boiler plant and other accessories. The Engineer, Mr. C. Nelson Hefford, in a statement to the Press, observes that the lines of the scheme are at present of a more or less confidential nature. From what he says, however, he does not appear altogether in favour of very high-pressure plant, and for these reasons: With high pressures the capital cost increases very rapidly; and, if fuel is cheap, the gain has to be substantial to justify the extra expenditure. However, Mr. Hefford is going very carefully into the question of the economies that can be obtained with modern plant, as well as the cost that would be incurred to secure them.

Liverpool.

The Liverpool Corporation are embarking on the installation of a second large generating set in their new Lister Drive No. 3 power station. This station is designed to accommodate ultimately five sets each of 25,000 KW.—the equivalent of 33,500 H.P. The contract for the work has been placed with the Metropolitan Vickers Electrical Company. It is expected that the new plant will be in commission by the autumn; and this will bring the total capacity of the generating machinery to 170,000 H.P.

Works' Libraries Campaign.

The object of this campaign is to persuade the directors of all factories, workshops, collieries, and businesses of all kinds to provide for their employees sound, readable, economic, and anti-Socialist literature. The Individualist Bookshop Ltd., of 40, Marsham Street, Westminster, S.W. 1, is prepared to supply a complete library of twenty-seven books for the sum of £6, carriage paid. The volumes have been selected with the greatest care; and the authors include eminent business men, economists, and historians. Books by party politicians have been excluded. To each purchaser of a library, the Organization will present a free subscription for one year to the Reading Circle. This scheme enables a large number of books to be read or examined in the course of a year, and will allow those who wish to do so to select further books to add to their collection. Any further information desired may be obtained from the Manager of the Individualist Bookshop (at the above address), who will also welcome criticism and advice. The Directors of the Individualist Bookshop Ltd., of whom Sir Ernest J. P. Benn is Chairman, appeal to those who are in sympathy with the objects to make the scheme known.

NATIONAL GAS COUNCIL.

A Meeting of the Central Executive Board of the National Gas Council took place on Jan. 11, at 28, Grosvenor Gardens, S.W.—the chair being taken by Sir DAVID MILNE WATSON (President).

Before proceeding to the business of the meeting, reference was made to the honour of Knighthood which had been bestowed on the President by H.M. The King.

Mr. FRANK JONES (a Vice-Chairman of the Board) moved "that this Board tender their most sincere congratulations to Sir David Milne Watson upon receiving the honour of Knighthood. They recognize the high attainments which have gained him this honour, and welcome this opportunity of placing on record their great appreciation of his services to the gas industry during the many years he has been President of the National Gas Council."

The motion was seconded by Alderman J. H. LLOYD (Birmingham), and carried unanimously.

AMENDING GAS LEGISLATION.

The steps which the Council had taken in this matter were reported, together with the views of the Board of Trade thereon. A representative Committee was appointed to consider the views which had been submitted by the Board of Trade on the Council's Memorandum.

FACTORIES (NO. 2) BILL, 1926.

It was reported that the Joint Sub-Committee of the Federation of Gas Employers and the National Gas Council had had several meetings with regard to this matter, and had thoroughly considered the provisions of the Bill. The Joint Sub-Committee had submitted a report upon the Bill, together with their recommendations.

RAILWAY RATES.

It was reported that the Railway Companies had submitted provisional proposals respecting the reductions to be made from the standard charges where damageable merchandise was carried by merchandise train under owners' risk conditions. It was stated that the Council had carefully considered the articles specified in the proposals which, either directly or indirectly, affected the gas industry, and noted that, while in one or two cases small reductions were allowed in instances where no such reductions had previously been permitted, in the vast majority of cases articles which had previously received a 15 p.ct. reduction were to have a much smaller reduction, or in many cases no reduction at all.

The Council had, therefore, submitted formal objections to the proposals, on the ground that various articles excluded from the Railway Companies' Provisional Proposals should be included, and also that the allowance made on the articles enumerated in the proposals was inadequate and insufficient.

It was added that the judgment of the Railway Rates Tribunal had just been published, and that it was thought it would prove disappointing to the industrial community. With one or two minor exceptions, the suggestions of the Railway Companies had been accepted by the Tribunal *in toto*.

The Council, in co-operation with the iron and steel industry, had asked that the actual rates at which coal was generally passing—viz., an increase of 40 p.ct. upon the base rates, *plus* flat rate—should become standardized and be made the standard charges. The Tribunal state that they have no power in law to undertake this proposition, but the Council submits that the Tribunal are wrong in this particular contention.

The Central Executive Board agreed that the iron and steel industry and the Traders' Co-ordinating Committee of the Federation of British Industries should be consulted as to what further steps should be taken in the matter.

TAR.

(*a*) *Meeting of the North-Eastern Bye-Products Association to consider the Draft Constitution of the British Road Tar Association.*—It was reported that a special meeting of the North-Eastern Bye-Products Association would take place in Newcastle on the following day, at which the question of the Constitution of the British Road Tar Association was to be discussed. It was understood that all the coke oven tar producers on the North-East Coast were represented upon the North-Eastern Bye-Products Association; and it was hoped that the resolutions would be passed approving the formation of a Coke Oven Tar Producers' Board and the Draft Constitution of the British Road Tar Association.

It was also stated that the meeting in question would shortly be followed by a meeting of the National Association of Coke and Bye-Products Plant Owners, representing the whole of the coking industry.

(*b*) *Draft Specification of Tar for Road Surfacing.*—It was stated that the specification submitted to the Central Executive Board at their previous meeting had been further considered by the Joint Tar Committee at their meeting on Jan. 4, when it had been unanimously agreed that it would be in the interests alike of producers and users of tar to avoid reaching any hasty conclusions. The Committee had accordingly decided to withdraw the draft specification already submitted to the Board, and to review the whole position. A Technical Sub-Committee had thereupon been appointed, representing the gas and coking industries, respectively, and the distillers, "to consider, in the light of the information already collected, the kind of tar best suited for road purposes, and as a result of their investigations to recommend what supplements (if any) to the present Roads Department Specifications are practicable and desirable to further the interests of the producers and users of road tar in England and Wales."

CLAIM REGARDING RENTAL OF METER.

It was reported that a Gas Company had entered into an agreement with a consumer for the sale of gas and the hire of a meter; the contract being signed by a third party as guarantor. It had been contended in the County Court by Counsel for the defendant that the contract could not be seen by the Court on the ground that it was unstamped.

After a hard fight, the Gas Company had obtained judgment in their favour; and the defendant had now appealed to the High Court. It appeared, however, that the decision of the County Court Judge having once ruled that a stamp was not required, was final, and that the question of stamping could not be reopened on appeal.

The judgment of the High Court had not yet been given; but in view of the importance of the matter to the gas industry at large, the attention of the Council had been drawn to the case by the Gas Company concerned.

RATING.

It was reported that on Jan. 4 a meeting had taken place of the Rating and Valuation Committee of the Conference of Public Utility Associations, when the following subjects had been discussed.

Valuations in Scotland.—Representatives of the water industry had urged that the Conference should press the Government to introduce a Bill dealing with the subject of valuation of public utility undertakings at an early date, for the purpose of remedying and abolishing many anomalies at present existing. It had been agreed that a meeting of representatives of public utility associations in Scotland should be held in Glasgow at the beginning of next month for the purpose of formulating a Bill for submission to the Government.

England and Wales.—It had been reported that the Government intended at an early date to introduce a Bill for the purpose of setting up a Central Valuation Board to deal with railway undertakings. When the Rating and Valuation Bill was originally introduced, there were provisions in this Bill giving the option to public utility undertakings to be valued by a Central Valuation Board; and this proposal was approved by the Central Executive Board of the Council. The Rating and Valuation Committee had decided to seek an interview with a representative of the Ministry of Health to find out the exact position, and, if necessary, to press the Government to include in the Bill provisions covering the case of "special properties." It was suggested that the Rating Committee of the Council should be called together after this interview, in order to ascertain whether any of the proposals made would affect the gas industry in particular.

Rating of Machinery.—It was stated that the Committee appointed by the Ministry of Health under section 4 of the Rating and Valuation Act, 1925, had now reported in accordance with the provisions of the Act with regard to the classes of machinery and plant which were deemed to be part of the hereditament, and thus became liable to be rated. This question had been submitted to members of the Rating of Machinery Committee appointed by the Council for the purpose of ascertaining to what extent the gas industry was affected as a consequence of this report, so that, if found desirable, representations could be made to the Ministry of Health under the provisions of the Act.

MODEL FORM OF COAL CONTRACT.

It was reported that, in accordance with the instructions of the Board at their previous meeting, the Officers of the Council had drawn up a model form of coal contract to be submitted to a small Committee in order to ascertain whether it would meet the views of representatives of gas undertakings, having regard to the varying practice prevailing throughout the country. It was agreed that each of the districts should be asked to nominate a member to the Committee in question.

Medical Men Agree.—No. 154 of "A Thousand-and-One Uses for Gas" contains 25 interior views of the headquarters of the leading medical and sanitary societies in London. These photographs reveal a remarkable unanimity of opinion as to the practical solution of the problem of heating modern buildings without creating smoke—*i.e.*, by gas. Where medical and sanitary authorities agree on a matter of this nature, it follows that their methods should be practised by private individuals as well.

A LARGE GAS COMPANY ACQUIRES COLLIERY INTERESTS.

From the last number of "Das Gas- und Wasserfach," to hand (Jan. 8) we learn of an agreement by which the Deutsche Continental-Gas-Gesellschaft is acquiring the colliery interests of the old-established firm of Georg v. Giesche's Erben, in Westphalia. By this important step, the largest private gas undertaking in Germany becomes owner of big coal concessions in the east part of the Westphalian coalfield, with completely up-to-date mining plant, and two coke-works having an annual output of some 50 million cub.m. of gas [1765 million c.ft.]. No doubt the geographical situation has prompted the deal, as the interests of the German Continental Company, so far as they lie in Germany, are mostly in the central regions of the country and in the environments of Berlin. In these districts alone, the Company and its subsidiaries supply about 200 million cub.m. [about 7000 million c.ft.] a year.

With the present trend of thought, and the many discussions in these days as to the future of gas making and gas supply, this latest move must, says our contemporary, be regarded as something more than a mere commercial transaction. Only recently, at the centenary celebrations of the German gas industry, the Company concerned was hailed from all quarters, both home and foreign, not only as one of the pioneers of gas supply, but also as representing all that is progressive in modern practice, commerce, and organization. There is, therefore, undoubtedly considerable significance in the present transaction.

The Company has as yet not interested itself in long-distance gas supply, but, in combination with its present works and widespread concessions, the new acquisition will open considerable possibilities in this direction. The chief consideration, however, appears to be that the German Continental is ensuring for itself entire freedom as regards supplies of raw material and all means necessary for exploring the whole realm of gas manufacture and distribution, with a view to continued and continuous progress.

It appears that part, at any rate, of the purchase price is to be satisfied in shares of the German Continental Company, so that the Giesche Company becomes a large shareholder of the Gas Company. Both have wide interests in Poland; furthermore, the American Harriman group has a half-share in the Giesche undertaking in Warsaw. As, also, the German Continental stands in friendly relationship with influential English business circles, our contemporary hails the transaction as something of an international entente in the world of commerce, to the credit of the gas industry. The universal interest which it has aroused should be not without its uses as an advertisement.

FEDERATION OF GAS EMPLOYERS.

A Meeting of the Central Committee of the Federation of Gas Employers was held on Jan. 11, at 28, Grosvenor Gardens, S.W.

Before the business of the meeting, Alderman F. S. PHILLIPS (Salford) referred to the fact that at a recent meeting of the Manchester Regional Council, the Workers' representatives had moved that a message of congratulation be conveyed to Sir David Milne Watson on the honour bestowed upon him by H.M. The King. The Trade Union representatives on the Council had also expressed appreciation of the services which Sir David had rendered to the National Joint Industrial Council. Alderman Phillips stated that this incident had given great pleasure to the Employers' side of the Regional Council. He then moved that "the Central Committee have learnt with great satisfaction of the honour and dignity of Knighthood conferred by H.M. The King upon Sir David Milne Watson, the Chairman of the Federation of Gas Employers, and most cordially and sincerely congratulate him upon this well-deserved honour."

Sir WILLIAM KAY (Manchester), in seconding this resolution, said that the affairs of the Federation had been conducted in a most statesmanlike way under the chairmanship of Sir David; and the honour which he had received would give great pleasure and satisfaction throughout the whole of the gas industry.

The motion was then put to the meeting, and carried unanimously with acclamation.

THE COAL STRIKE AND ITS AFTERMATH.

Through French Glasses.

Our contemporary, the "Journal des Usines à Gaz," in the first issue of 1927, publishes an interesting review of the position of the coal market. Certain passages therein are significant as showing the ill done to this country and to their own cause by the Miners' Federation, and as emphasizing the effort that is needed to regain what is lost; and we present the following extracts.

The coal strike in England, which began with an attempted general strike early in May, ended only in the last weeks of the year, and brought with it a set-back to the miners, since the local agreements in the various districts in most cases meant an increase in hours or a lowering of wages. Numerous pits have been closed, and arrangements have been negotiated among groups of owners for better working; but before the industry can re-organize itself on modern lines with improved plant, it must raise its head above the slough into which it has been dragged by the strike.

better seen from the figures relating to coal imports into France during the first nine months of 1926 (see table). Of the fifteen million tons of coal which are imported annually to make-up the requirements of France, England supplied 87 p.ct. in 1923, 78 p.ct. in 1924, and 67 p.ct. in 1925. For the first nine months of 1926, British coal exports to France fell to about 33 p.ct. of the total required from abroad; and the figure will certainly come out lower over the whole year.

It is quite obvious that Germany will attempt to retain some of the markets she has captured, both in her own country and abroad. The German mines affiliated in the Kohlensyndikat are organizing with the gas industry in Germany to throw out Durham coals from the North Sea and the Baltic Regions; while abroad, Germany has done her best to secure long-term contracts which, where obtained, will for a period effectually block the English outlets. Meanwhile, the last of the British Government restrictions on the export of anthracite and coke

French Imports of Coal—Metric Tons.

—	Great Britain.	Belgium and Luxemburg.	United States.	Germany.	Netherlands.	Poland.	Other Countries.	Total.
1926.								
January	803,701	164,365	4,609	384,960	48,657	..	26,117	1,432,409
February	777,624	203,748	12,625	516,653	60,489	10,064	23,561	1,604,764
March	830,086	59,433	1,000	404,595	48,541	..	8,459	1,352,114
April	735,072	152,563	2,500	609,565	59,389	11,995	21	1,571,105
May	451,285	264,685	2,284	414,875	70,194	16,640	..	1,219,963
June	85,944	300,566	10,476	616,257	67,145	6,998	331	1,087,717
July	46,902	264,717	19,981	677,615	75,130	9,656	1,009	1,095,010
August	95,777	222,632	3,275	854,150	89,872	24,376	3,585	1,293,667
September	85,569	204,018	5,009	737,787	61,667	10,640	2,973	1,107,663
Total—9 months, 1926	3,911,960	1,836,727	61,759	5,216,457	581,084	90,369	66,056	11,764,412
Total—9 months, 1925	7,029,932	1,370,366	158,638	4,101,706	413,658	..	132,848	13,207,148
Total, 1925	10,036,764	1,897,713	204,199	5,517,944	563,367	..	176,430	18,396,417

During the seven months of the stoppage, England, according to normal working, should have exported four million tons of coal per month—that is to say, over twenty-eight million tons all-told. Instead of this, she has had to buy from other powers more than eighteen million tons, of which 5½ millions were provided by Germany. This complete turn-round is perhaps

were removed on Dec. 12; and this would seem to have signalized the opening of a severe struggle between British and German producers.

[Regarding the reference to Durham coals, it is interesting to recall the letter by Herr Ernst Körting which was published in our issue for Dec. 15, p. 690.]

AUSTRALIAN GAS INSTITUTE.

FIRST ANNUAL CONVENTION. MELBOURNE—NOVEMBER, 1926.

Extracts from the Address of the President,

Mr. P. C. HOLMES HUNT, M.INST.C.E., F.I.C.

The Victorian Gas Managers' Association was founded in 1905, and, with the exception of the period of the war, held annual meetings until 1925. The New South Wales and Queensland Gas Institute was founded in 1909; and though it, too, was unable to hold regular meetings during the period referred to, it held many attractive annual gatherings in Sydney

The amalgamation of the two bodies has already borne good fruit. I am sure you will agree with me that the formation of this Institute could only have been made possible by the breadth of view of those engaged in the industry in the various States. It was the unanimous desire of those framing it that the constitution should be as wide as to permit the entry into membership of all those engaged in responsible positions in the industry. Thus, though just previous to the amalgamation the Victorian Gas Managers' Association had a membership of 56, and the New South Wales and Queensland Institute a membership of 48, we are now in the proud position of being able to record that the Australian Gas Institute commences activities with a membership totalling 157. I feel convinced that the new Institute has a great future; that it portends much for the industry, and has been inaugurated at a time when its formation is more than justified. A full interchange of views is essential for the industry's progress; and there are many questions which the Institute can, in a collective manner, inquire into and solve for the benefit of all.

HISTORY OF GAS SUPPLY IN THE COMMONWEALTH.

Our meeting this week will, I feel, in time to come, be looked upon as an historic occasion; and therefore it will not be out of place for me to record to-day what were the beginnings of gas supply in the various cities of the Commonwealth.

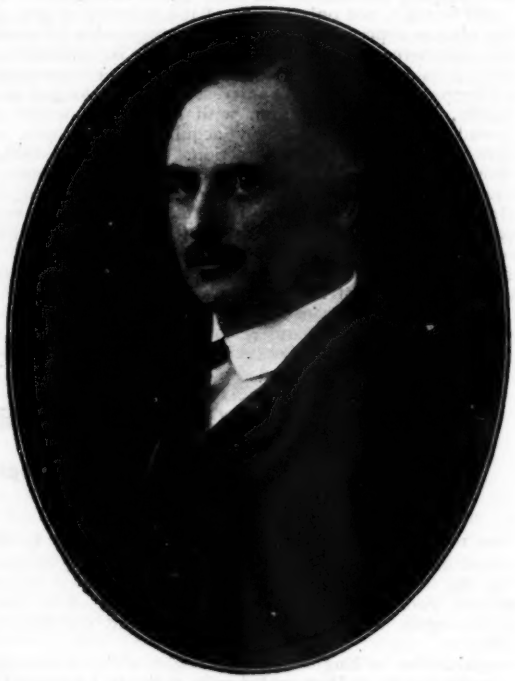
The pride of place in this regard belongs to that great undertaking—the Australian Gas Light Company, of Sydney. Although this undertaking was established in 1837, the records show that the lighting of Sydney with gas was first considered in the year 1826—exactly 100 years ago—a report on the proposal having been prepared; but nothing further was apparently done in the matter for some time. The first consignment of machinery arrived on May 15, 1839; and the works were put into operation in 1841. Notwithstanding the fact that a period of depression followed the establishment of the gas-works, it was not many years before the need arose for expansion; and holders were erected on land secured for the purpose both at Woolloomoolloo Bay and the Haymarket. By 1869 the head station in Kent Street had been considerably enlarged, and gas supply to outer suburban areas undertaken.

Early in the 'eighties the Company found it necessary to establish another station, with water facilities for reception of coal, and a site of some 80 acres was purchased at Mortlake, on the Parramatta River. Gas manufacture commenced at the Mortlake Works in 1886. In 1890 the goodwill of the Parramatta Gas Company was purchased, and the works of that Company were, in due course, dismantled; Mortlake taking up the supply to the Parramatta district. In 1912, owing to the great growth of the city of Sydney, and the necessity for good wharf accommodation for overseas shipping, the site of the head station at Kent Street, with water frontage to Darling Harbour, was resumed by the Government. Consequently, manufacture of gas was concentrated at the Mortlake Works, and the Kent Street Works were finally closed down in 1921.

The development of Melbourne, from its foundation in 1837, had been rapid; and we find that a few years after the establishment of the Sydney Company, there had been much talk in Melbourne of the need for a better illuminant than that provided by candles and oil. The City of Melbourne Gas and Coke Company was formed under an Act of Parliament passed in the year 1853; and the laying of the foundation stone of the first Melbourne Gas-Works took place on Sept. 1, 1854. The works were opened on Jan. 3, 1856. The coal came from Scotland, and the price of gas was 25s. per 1000 c.ft. On Aug. 22, 1860, an Act was passed incorporating the Collingwood, Fitzroy, and District Gas and Coke Company, Ltd., providing, *inter alia*, for a maximum price of 17s. 6d. per 1000 c.ft., for gas, and a maximum dividend of 25 p.ct. per annum. Subsequent to the formation of these two Companies, the South Melbourne Gas Company was incorporated, also by Act of Parliament. On Dec. 20, 1877, the much-discussed Act, known as the Metropolitan Gas Company's Act of 1878, became law. Some of the words of the preamble were: "Whereas it would be of public and local advantage, and also to the advantage of the respective Companies, that the said Companies should be amalgamated into one united Company . . . be it therefore enacted, &c." This Act had wide significance. It incorporated the progress of thought on company administration. It followed the sliding-scale method of dividends, based on a standard price of 7s. per 1000 c.ft., from 1884 onwards. Like Mr. Cohen, in Sydney, Sir John Grice, the present Chairman of Directors of the Metropolitan Gas Company, has been associated with his Company for a long time, having been elected to the Board in March, 1890, and appointed Chairman in February, 1901.

The Hobart Gas Company (known at its formation as the Hobart Town Gas Company) was incorporated on Oct. 27, 1854; and the works were completed in 1856. The price of gas was 20s. per 1000 c.ft. In 1895 the Hobart Gas Company entered the electric light field, under a Special Act of Parliament. The electricity undertaking, however, was sold to the Government in 1915, in anticipation of the establishment of the hydro-electric scheme from the Great Lakes. The entire reconstruction of the gas-works took place in 1923, when vertical retorts superseded the old horizontal settings.

The first move to establish a gas company to supply Adelaide, South Australia, took place in 1861. A site was secured at Brompton, and by June, 1863, the works were completed. The



THE PRESIDENT,

P. C. Holmes Hunt, M.Inst.C.E., F.I.C.

maximum price authorized was 30s. per 1000 c.ft.; but the Company began operations with a charge of 21s. In 1877 the South Australian Gas Company absorbed the Provincial Gas Company, which was formed in 1868-9, and took over the country works at Gawler, Kapunda, and Strathalbyn. In 1917-18 these works were closed, but the Port Pirie Works, erected subsequently to 1877, are still retained and operated by the South Australian Gas Company. To the first Chairman of Directors—the late Sir Henry Ayres—who occupied the chair for 36 years, is generally credited the "making" of the South Australian Gas Company.

Brisbane citizens also manifested an interest in gas lighting in the 'sixties, and early in 1864 a meeting of interested citizens was held in the Municipal Chamber to consider the establishment of a gas company. Gas was first made at the Brisbane Gas-Works in 1865, on land near Petrie's Bight. The gas was sold at 15s. per 1000 c.ft. The coal used when the works were first put into operation came from New South Wales.

The earliest attempt to supply gas in Perth, Western Australia, was made in 1883; a Company having been formed to distribute acetylene gas. This project, however, was a failure, and was soon abandoned, to be followed by the formation of the Perth Gas Company, Ltd., with a nominal capital of £20,000. Gas was first supplied by the Company in August, 1885, and the price was 17s. 6d. per 1000 c.ft. The undertaking is now owned and operated in connection with electric supply, by the Perth City Council, and is the largest municipally owned gas undertaking in the Commonwealth.

The leading particulars of these undertakings, comparing the position of each at the first year of operations with its present position, are shown in the table herewith.

Company.	Date of Incorporation.	Capital Employed.		Price of Gas.		Mileage of Mains.		Gas Made.	
		First Year.	1926.	First Year.	1926.	First Year.	1926.	First Year.	1926.
Australian Gaslight Company, Sydney	1837	£34,600 Paid-up	£5,426,883	25s.	5s. 7d.	7	1752	Millions. 12	Millions. 7000
Metropolitan Gas Company, Melbourne	1853	£40,000 Authorized	£3,454,937	25s.	6s. 8d.	7	1222	15	4000
Hobart Gas Company	1854	£60,000 Authorized	£230,000	20s.	8s. 9d.	16	90	3½	143½
South Australian Gas Company, Adelaide	1861	£30,000 Authorized	£1,696,905	21s.	7s. 7d.	12	714	½	1340
Brisbane Gas Company	1866	£15,000 Authorized	£549,547	15s.*	6s. 3d.	..	253½	5¾	739
Perth Gas Company (Now Municipal Undertaking)	1883	£20,000 Authorized	..	17s. 6d.	7s. 11d.	2	163	1½	186

DEVELOPMENTS IN THE INDUSTRY.

I now pass rapidly on to the developments in our industry within one's own recollection, particularly those of the last two decades, for these have been phenomenally fruitful. In the last twenty years the consumption of gas in Australia has increased 400 p.ct. In addition, the times have become more strenuous, and the row harder to hoe. Costs of coal and labour have increased enormously; and it has required big efforts to keep down the price of our commodity.

About the year 1903 the big development in gas production was the use of inclined retorts. To many they appeared the last word in carbonizing practice, though they were soon to be challenged by improved machinery for charging horizontal retorts. The inclined retort, in fact, had the effect of consolidating the views of the advocates of the horizontal retort. Improved machines, allowing better charging of the retort, and larger charges, were quickly developed; and there are many to-day who claim, from the point of view of their particular works at least, that the horizontal retort has no serious rival.

Several years followed before the retort was fully up-ended, and a really "vertical" retort, based on the law of gravitation, became a commercial proposition—charged intermittently, at first, but later on continuously. The rapid development and improvement of continuous carbonization has been particularly marked, and need not be dwelt upon by me. That one installation, capable of manufacturing 1,000,000 c.ft. of gas per 24 hours, leaving coal storage and handling out of the question, can be placed on an area of approximately 2400 sq.ft., and successfully operated by two men per shift, is a great achievement. It is on that basis that the new installation of Glover-West retorts at the Footscray Works of the Colonial Gas Association, and the new retort house at the Hamilton Works of the Newcastle Gas and Coke Company, have been erected. Indeed, the question of space for retort houses is not now "the" consideration—the main problem of planning being the convenient allocation of the space for coal storage and purifying plant. Admittedly, however, these modern developments are not commercially applicable to the limits of small outputs, as experienced on our small works.

Turning to retort house operating charges, these differ in small country works from those in the large works. With hand-stoking, the costs are at their highest; but once the output of a works approaches the capacity of 125 million c.ft. per annum, or (say) 500,000 c.ft. per day, the vertical retort becomes a practical proposition, though the capital charges are substantially increased.

At present, economical carbonization in small works is not possible; and frequently the high cost of production is caused by the fact that the stoker, or stokers, cannot be fully occupied in carbonizing duties alone. Some of us have had visions of the possibility of a more automatic gas-making plant being introduced, whereby a day's output could be manufactured within a couple of hours or so—the men being then free for other duties for the rest of the day. Even for works making 50 million c.ft. of gas per annum, and upwards, the vertical retort would appear to be a possibility only so long as an installation can be designed which will not demand continual attention on the part of the operator.

In the larger undertakings employing vertical retorts, the wages for manufacture (although they show some margin for reduction) do not offer the possibility of anything substantial. For instance, in large works, carbonizing wages will vary from 3d. to 5d. per 1000 c.ft., according to the type of plant in use. It is clear that a substantial reduction of this item cannot be realized; but some improvement should be striven for.

Broadly speaking, one would look for a big improvement with the development of bulk carbonizing. I do not mean merely the carbonization of a few tons of coal in a retort—even ten tons—but rather the possibility of carbonizing, or perhaps gasifying, much larger charges in one unit. Such a development was indicated in 1922 by Evans and Sutcliffe, who then suggested the distillation of as much as 250 tons per day in one plant. In the following year I had the privilege of discussing their work with these gentlemen, and I was impressed with it.

RESIDUALS.

An analysis of the accounts of several of the leading companies in Australia indicates that there is apparently not a great deal to be gained under present conditions towards a substantial reduction in the price of gas per heat unit by an increased gaseous thermal yield. This is because the selling price of the gas is so largely affected by the prices obtained for residuals. The return from coke per 1000 c.ft. of gas made may represent 1s. to 1s. 6d.; and from tar 7d. to 9d. The high production of thermal units in the form of gas is all very well from a theoretical point of view, and for the laudable and national requirement of coal conservation; but, unless such a process results in an appreciable financial advantage, there is no inducement to change over from the present plant and methods, and gasify the coke produced, except in special circumstances. Of course, values vary in different localities, and may change from time to time. Consequently each undertaking has its own special considerations.

A change-over to the more or less complete gasification of coke may result, in some cases, in an advantage of a few pence per 1000 c.ft.—say, ½d. per therm. This view is subject to local conditions.

REPAIRS AND MAINTENANCE.

An item of considerable importance which enters into our costs is repairs and maintenance. This, in regard to manufacture and distribution, and including depreciation, runs to 1s. per 1000 c.ft., while with the larger undertakings it is from 1s. 6d. to 1s. 9d. With the country works, of course, this is much smaller. The wear and tear on such plants is not so great, and a lower rate of depreciation is justified, since the question of obsolescence does not enter into the calculations, unless in a particularly rapidly growing town.

It is frequently false economy to use the lowest-priced material, either in renewals or in original construction work. This has been exemplified in the development with gasholder practice. In Australia, experience has shown the life of holders to be comparatively short when they are constructed of modern mild-steel sheets. My experience is that material at least equivalent to "Armco" iron sheets should be used for such work. Recently, for a 2 million c.ft. holder for the South Australian Gas Company, the bell of the holder was specified to be made of "Armco" ingot iron. The sheets are to be rolled to standard specification in Britain. These "Armco" sheets, while considerably superior in analysis and other qualities to the best wrought-iron sheets of British manufacture offered, cost little, if any, more.

TINDALE TAR TREATMENT PROCESS.

Owing to the much larger quantity of vertical tar produced, the greater proportion must be dehydrated and distilled before it can be used for road-making purposes. Vertical retort tar is, in composition, largely different from the tar produced in horizontal retorts. It contains an excessive proportion of paraffin waxes, technically known as petrolenes; and their proper adjustment and proportioning in the tar are essential before it is suitable for use on roads.

For the solution and economical treatment of this problem, the industry is indebted to Mr. Harold Tindale, Engineer-for-Works of the Australian Gas Light Company, and his staff. Under the Tindale process, tar excellent in every way for road-making purposes can be produced in a satisfactory manner. The product of the process is known throughout Australia as "Duratar;" and I must record the success of the scheme initiated by the late Secretary of the Australian Gas Light Company, Mr. C. C. B. Gurnett, whereby the production of "Duratar" to standard quality is now an accomplished fact in at least

four of the States of the Commonwealth. Even with this excellent product, competition from bitumen in most States is severe.

CO-OPERATIVE ADVERTISING.

The time is ripe, in my opinion, for the gas industry in Australia to follow the lead of our friends in Great Britain and America, and adopt a scheme of co-operative advertising. The British Commercial Gas Association now plays an important part in Great Britain. Our friends in New South Wales have already made a start in this direction, having formed the New South Wales Commercial Gas Association. While this Association can doubtless do good work locally, certain work done in a collective fashion by at least the principal undertakings in the capital cities is needed. To-day, several gas companies in Australia each has its own publicity officer; and it should easily be possible, therefore, to develop a scheme of co-operative advertising, which, if enthusiastically backed by the companies themselves, would be of outstanding benefit to the industry. Press advertising alone is insufficient. The greatest advertisement that we can have is the nature and the quality of the service we give.

I think I can justly say that gas has not had its proper publicity. For years much time and attention have been given to answering attacks and the overcoming of a prejudiced atmosphere. Now is the time for us fully to acquaint those interested with all the necessary facts. Let no false sense of modesty govern our publicity. Truth should characterize our efforts. The advertiser has come to stay; and we have to see to it that those of this profession whom we may employ are possessed of the necessary ability and qualifications to do our industry justice.

I think we are splendidly equipped for a long career of successful operations. Our technical staffs are of a high order, and those excellent trade journals which reach us regularly from overseas—the "GAS JOURNAL," the "Gas World," and the "Gas Age-Record"—are in every way organs worthy of our industry. Moreover, there are many manufacturers who for many years have been specializing in England, America, and Australia, in the production of appliances suited to different requirements. If we fail to continue the prosperity of our industry, it will not be because fundamentally we are not properly equipped to face competition.

Most undertakings have showrooms; and, if there is sufficient scope, the more we can have the better. We have to make it easy for people to buy. Our showrooms, however, must be attractive and inviting, and located with due regard to business-bringing power.

FUEL RESEARCH BOARD REPORT FOR 1925.

The progress made by the Fuel Research Board during the year 1925 is recorded in a report by them lately issued, at the price of 1s. 3d. net, by H.M. Stationery Office, Adastral House, Kingsway, London, W.C. 2, and in a statement by Dr. C. H. Lander (Director of Fuel Research) which accompanies it. Sir Richard T. Threlfall, K.B.E., F.R.S., as Chairman of the Board (one of the members of which is Mr. Samuel Tagg), signs the report made by them to the Committee of the Privy Council for Scientific and Industrial Research.

Steady progress is recorded in the work of the physical and chemical survey of the national coal resources; and the Board consider this work, both in ascertaining the properties of the various coal seams as they occur, and as they are or might be prepared for the market, and in working out methods for the sampling of commercial consignments of coal, is of prime importance to the coal industry of the country, as well as to all large users of coal. It is recognized that the importance of methods of sampling and analysis of coal is being increasingly realized; and the Board state that the methods of analysis recommended in an interim report issued in 1923 (which was summarized on p. 638 of the "JOURNAL" for Dec. 5 of that year) have, in essentials, stood the test of time, and have obtained very general acceptance. A final report, embodying such minor amendments as have been found desirable, is in course of preparation. The question of sampling, especially of large commercial consignments, is one of great difficulty; but considerable progress has been made by the Special Sub-Committee dealing with the question.

EXPERIMENTS WITH VERTICAL RETORTS.

Investigations have been continued into the use of vertical gas retorts; and a report was issued during the year under review on "The Enrichment of Coal Gas by the Injection of Oil into Vertical Retorts during Carbonization"—a subject suggested for research by Mr. Tagg, when he was President of the Institution of Gas Engineers. This report contained particulars of experiments, some figures from which were reproduced in the "JOURNAL" for Oct. 7, 1925 (p. 37). In these experiments the oil was injected through a water-cooled tube. The results were satisfactory, but suffered from the disadvantage that the water jacket caused a drain of heat which had to be made up by an increased consumption of fuel gas for heating the retorts. Some experiments were made without the water cooling; and it was found then that coke formed round the tube, and a hole persisted below the bottom of the tube for a considerable distance—sometimes to the bottom of the retort. The effect of the tube used for the oil injection has been further studied, and also the result of increasing the throughput. "It has," the Board say, "been found possible to increase the throughput up to double the normal, at any rate when using certain coals. The effect of this is interesting, as tending in some respects to yield products akin to those generally associated with lower carbonization temperatures. Further work is required before any very definite statement can be made; and this is proceeding." The setting of experimental horizontal retorts was completed, but was not fully heated-up by the end of the year.

The work on low-temperature carbonization has continued. The large-scale experiments have been confined to the attempt to develop continuously working vertical metal retorts, with the object of obtaining good lump coke suitable for domestic use, and at the same time the maximum yield of oil-producing tar. This type of retort was selected as it is one which, if successful, should be suitable for use with a wide range of coals, and is not being developed elsewhere. Difficulties met with are recounted, and it is added that the knowledge gained will be utilized in the design of further retorts of special materials, which it is hoped will determine finally what possibilities exist in this type of retort. The Board add that "the problem can only be considered solved when a full-sized unit plant has been in steady operation for a period sufficient to prove that the depreciation and maintenance of the retort is sufficiently low to make commercial working possible. A few weeks or months may be sufficient to prove that a plant is not commercial; but some years are necessary to give a proof that it is really satisfactory."

The increase in the staff has made it possible to carry out other systematic work to determine the effect on the gas, tar, and coke produced of variations in the temperature of carbonization. At the same time laboratory investigations into the nature of the gas and tar are continuing; while a general research is being carried out into the reactivity of coke. Other laboratory investigations bearing on various aspects of the problem of the carbonization of coal are in progress.

REPORT OF THE DIRECTOR.

In his report, Dr. Lander makes further reference to work in connection with the gas industry. Alluding to the experiments on the enrichment of gas produced in vertical retorts by injecting oil, he says that the investigation has aroused considerable interest in the gas industry; and it is understood that trials are being made by several undertakings, in order to ascertain the commercial practicability of this method of affording greater elasticity of working vertical retorts. Several modifications have also been suggested, and are being investigated by the industry.

During the summer two of the retorts developed leaks, and were in consequence cooled down for repairs. Since the last time the retorts had been let down for repairs (at the end of 1922), 6932 tons of coal had been carbonized, or an average of 7·65 tons per day for the whole period from Jan. 16, 1923, to July 11, 1925. In repairing the lower portions of the retorts, it was decided to put extra bricks on the outside of those sections which had failed. This necessitated cutting-back the corresponding wall of the combustion chamber; and as the whole of this section of wall had to be rebuilt, it was decided to make up its thickness to the original dimensions by means of 22½ in. of silica firebrick and 4½ in. of West's insulating brick. The new insulation resulted in a marked reduction in the heat losses from this portion of the outer walls of the retort setting; while subsequent tests again emphasized the great drain of heat that results from any ironwork embedded in the insulating material. After the repairs, experiments were continued with oil injection, using tubes, without water jacketting; but difficulties were encountered owing to the tubes becoming choked, either by carbonization of the oil, or by coal dust.

MAXIMUM THROUGHPUT.

At the end of the year experiments were in progress to determine the maximum throughput of coal. It was found that the nominal throughput could be increased considerably when using a graded coal, such as Mitchell Main gas nuts, though, as was to be expected, difficulties arose when attempting a similar throughput with run-of-mine coal containing a considerable proportion of fine coal. It has been found possible to increase the throughput using a graded coal up to double the

normal amount, and the effect of this is interesting. The coke produced is more free burning than ordinary gas coke, and is rather of the nature of a mixture of high and low temperature coke. The gas yield per ton is reduced, but the yield of tar per ton is considerably increased; and the tar has a lower density and viscosity than ordinary tar. The investigations had not proceeded far enough for enabling the possibilities in this direction to be estimated, or for the characteristics of the coke and tar to be properly determined.

The experimental setting of horizontal retorts consists of eight moulded retorts, 20 ft. long, 23 in. by 16 in. cross section, of an oval ⌂ shape. The setting can be heated either from its own gas producer or by means of water gas. An electric Guest-Gibbons charging and discharging machine is provided; and the coke is discharged into a "Dryco" apparatus for dry cooling.

Small Coke in Water Gas Generators.

The water gas plant was kept running throughout the year; and the method by which it is used as a producer when not required for water gas has been continued, with satisfactory results. The fuel used has consisted of any type of coke that was available from the retorts. So far as possible, screening has been avoided, and large quantities of fuel of a type not generally considered suitable for water gas generators have been made use of. This naturally reduces the capacity of the plant to some extent; but apart from this and some fouling of the valves and scrubber, the use of very small coke has had no bad effect.

Metal Retorts.

Low-temperature carbonization forms the subject of the next section of the report; and as to this it is pointed out that attempts at the Fuel Research Station to develop a commercial scale plant have recently been confined to investigating cast-iron vertical retorts with external heating, as internally heated retorts are being adequately experimented with elsewhere. Close touch has been maintained with individuals and firms developing other types. The existing retorts are described, and mention is made of the fact that when these have served their purpose it may be desirable to erect fresh retorts of special metal to withstand higher temperatures. The question of the most suitable metal to use is being investigated, with the co-operation of the British Cast-Iron Research Association and Prof. H. C. H. Carpenter. "It would," Dr. Lander says, "appear that, given a suitable metal for the retorts, there is no difficulty in producing a lump coke for domestic use from a suitable blend of coal when charged in reasonably small sizes. The more intimate the blending, the more homogeneous and stronger will be the resulting coke; but for intimate blending the coal must be of small size, and this prevents the free and rapid escape of the vapours which is essential for high yields of tar. The type of retort in question is quite satisfactory for carbonizing lump coal, provided it is not too strongly swelling. An alternative is the production of briquettes of suitable blends; but this adds to the expense, and the binder presents a difficulty. Work on these lines, but using an internally heated retort, is being pursued by Leigh Smokeless Fuels, Ltd., using the Sutcliffe-Speakman method of briquetting under high pressure without binder. There have been suggestions for preparing binding material from straw and other vegetable substances. Should experiments be successful in providing a cheap and smokeless binder, it makes possible the preparation of briquettes before carbonizing, so that the maximum oil yield should be obtained, and good lump coke produced from fine coal."

Reactivity of Coke.

There is an account of investigations carried out in connection with the constitution of low-temperature tars, and a large amount of other work that has been accomplished or was in contemplation. The subject of the reactivity of coke was being investigated in conjunction with the Fuel Economy Committee of the National Federation of Iron and Steel Manufacturers; and a method has been designed which gives an empirical figure for reactivity to carbon dioxide. The method depends on measuring the amount of carbon monoxide formed when a standard volume of carbon dioxide is passed over coke under standard conditions. It appears from these investigations that the reactivity of any sample decreases as the reaction proceeds; a succession of determinations on any sample giving figures which gradually decrease to a value which tends to a constant.

Mention is made of the fact that when a fine particle of coal is dropped down a heated tube it carbonizes in a few seconds; the resulting coke being in the form of a hollow sphere. Investigation on these lines was being continued, as it should not only throw light on the process of carbonization, but may have a direct practical bearing. The carbonization of coal in fine particles forms the basis of the McEwen-Runge method of low-temperature carbonization. This method consists in showering fine particles of coal through a current of hot gases, resulting in the formation of a pulverized coke which it is hoped will be suitable for direct firing under boilers, with all the advantages of pulverized coal firing, and at the same time enabling the volatile products of carbonization to be recovered.

Recovery of Spirit from Coal Gas.

Several processes for the recovery of spirit from coal gas have been investigated, in order to determine which (if any) is more suitable than oil washing. In this connection, different forms of activated carbon have been examined and compared. The adsorption capacity of the samples was determined by passing a measured volume of air containing a known amount of benzene vapour at a definite velocity through U-tubes packed with the active carbon, and periodically noting the gain in weight of the tubes. For example, active "T" carbon, the most satisfactory so far, adsorbed 40 to 42 p.ct. of its own weight of benzene, with an efficiency of 96 p.ct., the adsorption efficiency thereafter rapidly diminishing. Furthermore, it was observed that when the benzene saturation fell below 0·5 p.ct. no adsorption took place. From the results obtained, the maximum recovery of benzene from coal gas to be expected by using this carbon would be 93 p.ct. of the benzene present.

One of the appendixes to the report gives a summary of the progress of the physical and chemical survey of the national coal resources of Great Britain, while another contains the substance of memoranda of general interest prepared by Dr. Lander in his capacity of Assessor to the Royal Commission on the Coal Industry.

GASHOLDER WELDING.

In "Das Gas- und Wasserfach" for Oct. 30 last, Herr Tews, of Kallies, described an interesting welding operation which was successfully carried out on a small local holder, of some 14,000 c.ft. capacity, which represented the only storage of the works.

Serious leakages were occurring, and examination showed that many plates in the lower lift had rusted to paper thickness, and could even be pierced in places with the finger. The management were faced, therefore, with the prospect of either the cost of a new holder or the grave inconvenience of suspending gas supplies for a period of several weeks while extensive repairs were made, with the chance of entirely losing many consumers to the local electrical competitor. The makers, M. Hempel, of Berlin, advised, however, a welding operation, with the holder remaining in use; and this was eventually carried out by the Berlin welding specialists, Wegner & Co. Not only was there no interruption of any kind in the gas supply, but the whole work was carried out in the short time of twelve days; and the holder at the end appeared to have the same prospect of life as a new one, while all traces of leakage had disappeared.

The method adopted was to weld 24 new plates on to the old plates of the lower lift, completely covering it. In this way, a new lower lift was formed, which is entirely self-supporting, so that the holder will remain tight even in the event of the old ones wholly rusting away. The operation has proved entirely satisfactory, and not least from the financial point of view. The welding cost 30 p.ct. less than rivetting would have done, quite apart from the question of putting the holder out of action, as would have been necessary.

Separation of Ethylene and Benzole in Gas Analysis.—"Das Gas- und Wasserfach" for Oct. 30 last referred to a simple method, described by Meuser in "Het Gas," for determining the benzole and ethylene in coal gas. Whereas it was previously necessary, according to the method of Haber and Oechelhäuser, to carry out the separation with a fresh gas sample outside of the main analysis, it is now possible to determine the ethylene and benzole simultaneously in one operation. For the absorption, an 87 p.ct. solution of sulphuric acid is used, which absorbs no ethylene, but completely takes up its homologues and the benzole. Solution of bromine is then used to absorb the ethylene; and the respective contractions give the volumes of benzole vapour and ethylene previously contained in the gas. Results of analyses given show good constancy.

A Work of Art.—With Mr. J. Wilfrid Drake's compliments, we have received from the well-known Halifax firm a beautiful calendar. The calendar only forms a small pendant to the large card, which bears the picture of a lady carrying roses. It is a true work of art.

METHODS OF MEASURING TEMPERATURE.

By S. HOLE, Chief Chemist of the Bath Gas Light and Coke Company.

[Extracted from a paper read before the Western Junior Gas Association, Jan. 8.]

MERCURY THERMOMETERS.

Mercury is remarkably suited for low-temperature registration, having a wide range of liquidity—viz., 39° to 357° C.—and regularity of expansion throughout its temperature range. It is easily obtained in a high state of purity; it does not wet glass; and it has a low vapour pressure and specific heat, and, above all, a high conductivity. Thermometers designed to read temperatures up to approximately 300° C. are generally of plain glass, mercury filled. Above 300° C. the thermometers employed are more specialized. By filling the thread and tubulature of a mercury glass thermometer with an inert gas such as nitrogen or carbon dioxide under pressure, the boiling-point or distillation-point of mercury is lowered, and temperatures up to 500° C. can be measured. The limit of usefulness of a glass thermometer is about 550° C. This is due to the temperature reaching the softening-point of glass.

The pressures at which high-temperature thermometers are filled vary with the temperature at which the thermometer will be used. They are:

2 atmospheres	for a maximum temperature of				400° C.
20	,,	,,	,,	,,	,, 550° C.
60	,,	,,	,,	,,	,, 750° C.

Mercury thermometers have been designed in which the envelope is of quartz; the mercury being under high pressure. Thermometers such as these, invented by Siebert & Kühn, of Cassel, will register up to 700° C. Dufour has produced thermometers in which tin is employed as the measuring agent, and which gave readings as high as 1000° C. These thermometers have not come into general use; and expansion thermometers have been discarded for wide ranges of temperature.

The high-temperature glass thermometer is too fragile an instrument for rough works purposes. A more robust instrument is the mercury in steel thermometer; and this type, with indicators or recorders, is largely used for works purposes. This pattern of thermometer has a great advantage, apart from its robust nature, over glass thermometers in that mercury expansion can be transferred considerable distances to indicators or recorders, The registering device can therefore be in a position suitable for observation. The actual distance may be as much as 50 to 75 ft. from the source of heat. The mercury steel thermometer consists of a steel bulb and a Bourdon tube coil, connected by a length of flexible capillary steel tubing. Bulb, capillary, and Bourdon tube are filled with mercury under pressure, and the whole system is hermetically sealed. There is relatively little mercury in the capillary tube compared with that in the bulb, so that temperature reactions on the capillary itself affect the accuracy of registration only slightly. The capillary tube employed by Messrs. Negretti & Zambra in their instruments has a bore of only five-thousandths of an inch. One mile of this tube would hold one cubic inch of mercury; the relationship of capacity between capillary and bulb being 1 : 158.

As the steel bulb is affected by the source of heat, the mercury expands or contracts, affecting the Bourdon tube coil, causing it to open or close in the well-known way. This movement can then be transferred to a pointer for the indicator type, or a pen for the recording type of instrument. The mercury steel thermometer has a wide range of utility between 40° and 540° C. The recorder type is especially useful where it is of the utmost importance that steady working conditions be maintained hour by hour. Plant where records of working conditions are required readily suggest themselves; and I need only mention such diverse types as benzole and tar dehydration plants and steam superheater units, for others to suggest themselves.

THERMO-ELECTRIC PYROMETERS.

Where stationary indicators or recorders can be employed, a totally different type of instrument, known as the thermo-electric pyrometer, is available for low-temperature work (200° to 540° C.). The thermo-electric pyrometer is extensively used in a more specialized form for high-temperature measurements. The resistance pyrometer is suitable where an instrument is required which will indicate with great accuracy temperatures existing in one or more scattered spots; the readings being unaffected by the distance separating the points and the indicator.

Two very simple means of measuring temperature, and applicable to high and low temperature sources, are the Siemens water calorimeter, and Seger cones. For use by unskilled operators and in sources where a fine degree of accuracy is not required, they render good service.

SIEMENS WATER CALORIMETER.

The Siemens water calorimeter, introduced in 1871 by Sir William Siemens, consists of a well-lagged copper vessel into which a definite quantity of water is placed (one pint); a specially sealed mercury thermometer, and a variety of metal cylinders of copper, iron, or nickel, used according to the temperature of the source to be tested; copper and iron being available for temperatures up to 1000° C., and nickel for a further 200° C. The most suitable cylinder is placed in the furnace for a sufficient time to ensure its attaining the full temperature, and is then quickly transferred to the measured volume of water; the pointer on the scale having previously been adjusted to the cold water reading of the thermometer. When the temperature of the water becomes constant again, the temperature indicated by the thermometer and the sliding-scale should be read off; the sum of the two readings giving the initial temperature of the metal cylinder—*i.e.*, the temperature of the source.

This instrument is strong and portable, simple, and rapid in use. Beyond the cylinders, which are cheap and easily replaced, there are no delicate or fragile parts to wear out.

Seger cones are, of course, simplicity itself.

THERMO-ELECTRIC PYROMETERS.

Platinum platinum-rhodium couples will give, if suitably protected from reducing gases, metallic vapours, and silicon, temperature readings up to 1500° C. For lower temperatures, other metals are available. Up to 300° C. the couples can be made of copper, iron, silver, and constantan. With copper-constantan at temperatures above 300° C., unless heavy-section wires are used, rapid deterioration takes place. Iron-constantan is employed for temperatures up to 800° C. After prolonged heating, however, iron is subject to parasitic currents which originate in several ways—such as change in crystalline structure, segregation, and cavities of occluded gases in the casting. Up to 1000° C., and for spot readings at 1200° C., an alloy of nickel-chromium nickel-aluminium is available.

Base-metal couples develop four times the E.M.F. per degree as do platinum platinum-rhodium couples. This is a great advantage, as a robust pivoted indicator can be constructed for portable outfits without loss of accuracy. Their disadvantage lies in want of stability compared with the rare-metal couples, and they cannot be relied upon where permanency of calibration is essential.

The majority of thermo-couples are used with moving-coil indicators identical with millivoltmeters; and the scales are generally calibrated for direct temperature readings. The calibration will remain correct so long as the resistance of the circuit remains unaltered. A point to be borne in mind when using these instruments is the maintenance of even temperature conditions at the moving coil. Variations due to fluctuations of temperature will cause errors in reading. This is especially the case with low-resistance coils. With a 5 ohm resistance indicator, a variation of temperature from 0° to 35° C. along 50 ft. of wire from the thermo-couple to the instrument will cause the indicator to read 10° low at 650° C. Millivoltmeters are available with a resistance as low as 2 ohms, and the precaution mentioned is especially applicable to these. With high-resistance millivoltmeters up to 500 ohms resistance, this is not felt to the same degree, and readings giving a ± 5° C. accuracy can be relied upon. For the highest degree of accuracy, potentiometers must be employed.

Thermo-electric and resistance pyrometers, while exceedingly fine instruments for temperature work under what might be called stationary conditions, are not suited to a rapid sequence of readings in varying spots with one instrument. For example, this type of pyrometer would not prove successful under the rough working conditions of a retort house, where many combustion-chamber temperatures have to be taken, and time is a valuable factor.

RADIATION PYROMETERS.

To meet the need for an instrument which will do sensitive and accurate work, and yet be portable and robust, radiation and optical pyrometers have been evolved.

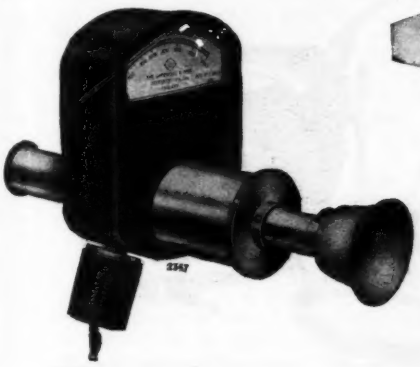
Having dealt with the theoretical principles of radiation pyrometers, Mr. Hole went on to describe the Féry radiation and spiral instruments—two types of radiation pyrometers of variable focus. In the former, the radiated energy from the hot source is collected by a mirror made either of glass with a gilt reflecting surface, or, better still, of copper with a polished deposit of electrolytic gold. The high thermal conductivity of copper, which thus acquires a steady temperature more rapidly than glass, tends to reduce the lag of the instrument.

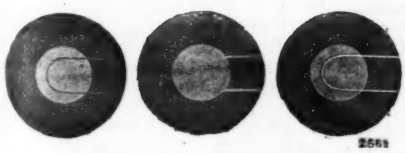
The Féry spiral pyrometer is a cheaper and simpler piece of apparatus. The radiations are focussed on to a spiral coil, instead of a thermo junction. The coil is a bi-metallic spring to which an aluminium pointer is attached. The two metals, which are soldered together, have different co-efficients of expansion. Therefore the spiral uncoils as its temperature increases, thus causing the pointer to move over a graduated scale. This instrument is not so accurate as the radiation pyrometer; but where absolute accuracy is not required, it gives a sufficient degree of precision for many industrial purposes. The spiral pyrometer has an adjustable zero for each reading. After a rapid sequence of readings, the spiral coil shows signs of tiredness, and becomes overheated, when it is found to be impossible to adjust the zero. When this occurs,

The Cambridge Optical Pyrometer.

Siemens Thread Recorder.

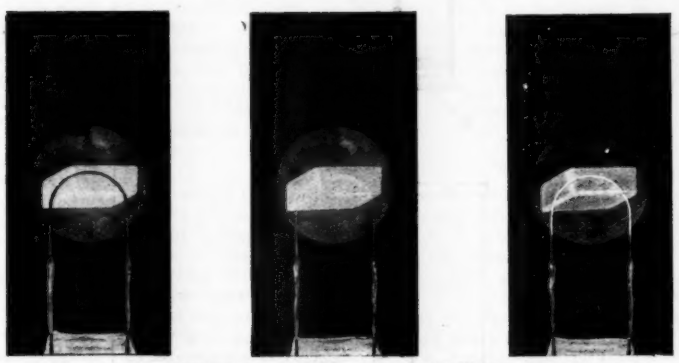
Siemens Multi-Point Indicator.





The Cambridge Disappearing-Filament Pyrometer.

(*a*) General. (*b*) Man Using Instrument.
(*c*) The Disappearing Filament.



Siemens Disappearing Filament Pyrometer, with Views of the Filament.

the pyrometer has to be rested before further observations can be attempted.

Theoretically, providing the hot source is larger than the thermo junction or spiral coil, the actual distance of the pyrometer from the source of radiation does not affect the reading of the pyrometer. In practice, this is found not to be the case, as radiation is affected by draughts, atmospheric absorption (smoke and tar-fog), and also to imperfections in the instrument itself—such as optical aberrations of the gold-plated mirror. Dust and dirt on the condensing mirror also affect the accuracy obtainable.

Speaking of the Foster fixed focus pyrometer, the author remarked that this instrument is simple to use, but requires a considerable area of hot body, so that the whole of the diaphragm of the receiving tube may be filled with radiation. To prevent secondary effects, such as stray radiations, affecting the readings, additional diaphragms are fixed in the tubes, or a coarse screw thread is cut on the internal surface.

Optical Pyrometers.

After treatment of the theory of the optical pyrometer, the author said that the types of pyrometer employing the polarimeter are the Wanner and the Cambridge. The pyrometers in which the brightness of the lamp filament itself is compared with that of the source are those of Holborn-Kurlbaum, Leeds & Northrup, Siemens, and the Cambridge & Paul Instrument Company. These are known as disappearing filament pyrometers.

A simple form of pyrometer employing the infra-red radiation wave lengths is the "Wedge" instrument of the Optical Pyrometer Syndicate. This does not lay claim to a high degree of accuracy; but an operator can, after practice, read to within 10° C. of a true figure. The "Wedge" pyrometer is simple, and one of the few instruments of its kind which can be placed in the hands of non-scientific workers, with an assurance that reasonably accurate work can be done with it. I have found that the phenomenon of "persistance of vision" will occasionally upset the readings. The "Wedge" pyrometer is made for varying ranges of temperatures between 525° C. and 2100° C.

With all types of optical pyrometer calibrated for "black body" conditions, low readings are obtainable when used in the open—*i.e.*, on molten metal in ingots, &c.—due to the reflection from their bright surfaces, which are consequently non-black bodies. In cases like this, the pyrometer must either be calibrated for non-black body conditions, or a correction applied, based on Kirchoff's law.

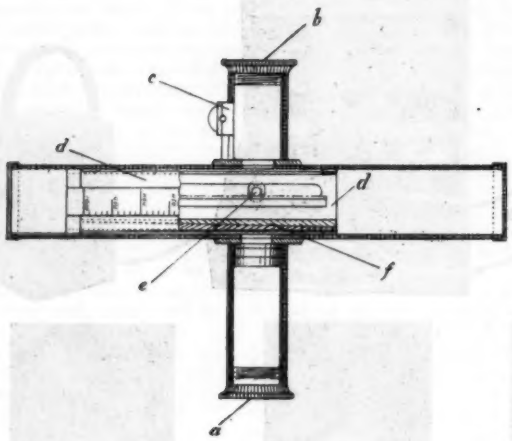
The Cambridge, the Leeds & Northrup, and the Siemens optical pyrometers differ from each other in constructional details. The principle upon which they are constructed, however, is the same.

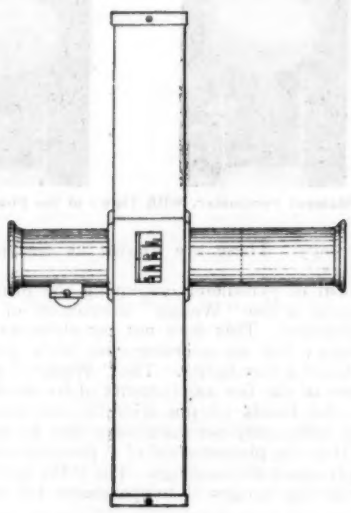
The disappearing filament pyrometer was first produced by

Morse twenty years ago. The principle was the matching of the brightness of a lamp filament against the brightness of a heated object. This idea was in use much earlier (1888).

Morse's pyrometer was modified by Holborn and Kurlbaum by the addition of an objective and eyepiece; a diaphragm being added to give a constant cone of rays entering the eye. All these pyrometers are fitted with one or two red eye-pieces which, while not reducing the brightness, facilitate the matching of intensities of light, as a monochromatic beam of light is obtained.

Siemens Indicator.





The "Wedge" Pyrometer (Two Views).

To enable a wide range of temperatures to be read, these optical pyrometers are supplied with absorption screens, which are fitted either over the objective or eye-piece, or in the interior construction of the pyrometer when temperature readings above 1400° C. are to be taken. The absorption screens reduce the intensity of the light from the source without affecting the working of the pyrometer. The eye-pieces are fitted with shields to cut out extraneous light when using the instrument. The lamp used has a horseshoe tungsten filament which is worked from an accumulator or battery. The brightness of the filament is governed by a rheostat placed in the circuit. In the Siemens pyrometer, the brightness is adjusted by two variable resistances in the telescope itself.

In practice these pyrometers are sighted upon the hot source, which need only be sufficiently large to cover the lamp filament. The brightness of the latter is increased until it merges into the source under test. As the filament is worked up to the correct condition of brightness, it will appear as a dark line on the bright source; when too bright, as a white line.

As brightness, and not colour, of light is matched, colour blindness is no hindrance to the use of these instruments.

In optical pyrometers of the polarizing type, of which the Wanner and the Cambridge instruments are typical, monochromatic beams of light from the source and the comparison lamp are obtained by polarizing the white light beams. The two beams pass through two holes at the front of the pyrometer,

The "L. & N." Optical Pyrometer, Telescope, and Control Box, containing Dry Battery, Rheostat, and Milliammeter.

and are rendered parallel by a lens. The parallel beams pass through a Rocon prism which splits each beam up into components polarized at right angles. A bi-prism produces deviation in the beams of such amount that images from each source are brought into juxtaposition. At this point, no fewer than eight semi-circular patches, uniformly illuminated, exist. The two in juxtaposition are polarized at right angles, and are

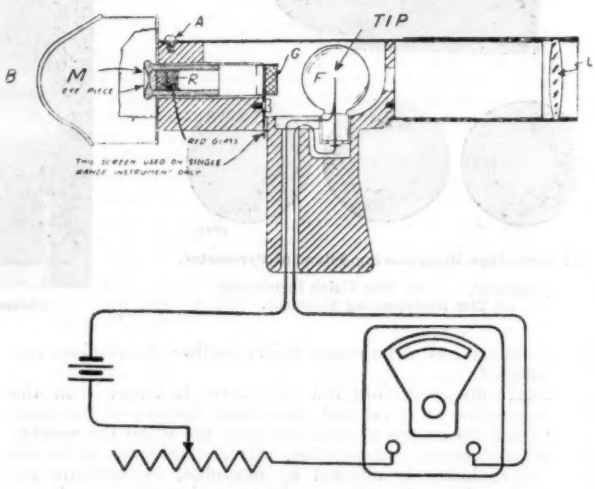


Diagram of Optical System and Electrical Circuit of the "L. & N." Optical Pyrometer.

viewed through the eye-piece; the sensation at the eye being that of two semi-circles of light—one from the source and one from the comparison lamp. The six other beams are screened out. The Nicol prism in front of the eye-piece can be rotated round the optical axis; its position being shown by a pointer travelling over a circular shield which is also calibrated. The action of the Nicol prism is such that, if, for example, the two beams are of equal intensity, then, with the plane of polarization of the prism making an angle of 45° with the direction of polarization of either beam, a uniformly illuminated circle will be observed having a diametrical line across where the two fields come into contact. Rotation of the prism in either direction will cut down the intensity of one of the beams, and increase that of the other.

When making readings with this type of pyrometer on metal-

lic surfaces, care has to be taken to sight normally, since light given out at oblique incidence is largely polarized. For temperatures above 1400° C., absorption devices are employed.

From the foregoing notes it will be seen that the makers of temperature measuring apparatus have made available a wide range of pyrometers, each of which will do excellent work, providing it is used with an intelligent appreciation of its possibilities and limitations. Whichever type of apparatus we use, a knowledge of its construction, and the laws upon which its operations are based, will enable us to do better work, and will give us a greater sense of personal satisfaction and interest in our work.

GAS BILLS FOR 1927.

(*Continued from p.* 84.)

LEEDS CORPORATION.

One of the objects of this Bill is to extend the boundaries of the City of Leeds so as to include the urban district of Gildersome, the townships of Templenewsam, Alwoodley, and Eccup, and part of the township of Austhorpe. The limits for the supply of gas by the Corporation shall include the whole of the city—provided that nothing in the Bill shall affect the powers and obligations of the Drighlington and Gildersome Gas Light Company or of the Crossgates, Halton, and Seacroft Gas Company, Ltd., or shall be deemed to empower the Corporation to supply gas within the limits of supply of either of those Companies without the written consent of the Company concerned, except so far as is provided (as regards the last-named Company) by Part IV. of the Bill. This part is to empower the Corporation to purchase the undertaking of the Crossgates, Halton, and Seacroft Gas Company, at a sum to be agreed upon or determined by arbitration. Within three months after the appointed day (April 1, 1928) the Corporation shall give notice to the Company of their intention to purchase the undertaking. On the day of transfer (March 25 or Sept. 29, which shall first happen after the expiration of two months after the amount of the purchase money to be paid by the Corporation has been determined, or such other day as may be agreed) the undertaking shall be vested in the Corporation; and the production of a King's printer's copy of this Act duly stamped, together with a receipt for the purchase money purporting to be signed by three Directors of the Company or by the Cashier of the Bank of England shall (unless it be proved that the purchase money has not been paid) be conclusive evidence in all Courts and proceedings of the transfer. Thirty years are suggested as the term for the repayment of the money to be borrowed for the purchase of the undertaking.

[*Parliamentary Agents: Messrs. Sharpe, Pritchard, & Co.*]

MANCHESTER CORPORATION.

The Manchester Corporation, also, are wishful to extend the city boundaries—in this case to include the townships of Baguley, Northen Etchells, and Northenden. The Bill provides that the Corporation may by agreement with the Stretford and District Gas Board and the Altrincham Gas Company, but not otherwise, acquire so much of their undertakings, rights, and privileges as is situate in any part of the added area. Unless otherwise agreed with the undertakers, the Corporation shall not supply gas within that part of the added area which is included in the limits of supply of the undertakers, until they have acquired the part of their undertaking therein.

[*Parliamentary Agents: Messrs. Sharpe, Pritchard, & Co.*]

MATLOCKS URBAN DISTRICT COUNCIL.

A Bill deposited by the Matlocks Urban District Council comprises 256 sections, some of which relate to their gas undertaking. Many of the general sections already referred to in connection with other Bills are included; but, in addition, the Council desire to extend their limits of supply so as to include the parish of Dethick Lea and Holloway, in the rural district of Belper—provided that it shall not be lawful for the Council to supply gas within the limits of supply as on July 20, 1896, of the Matlock and District Gas Company, unless with the previous consent in writing of that Company. The price to be charged by the Council for gas supplied by them by meter shall not at any time exceed 1s. 2d. per therm within the existing gas limits and 1s. 3·4d. per therm in the added limits; provided that the price charged in the added limits may exceed by not more than 1·4d. per therm that charged to similar consumers within the existing limits. The charge for the hire of a prepayment meter and fittings is not to exceed 3d. per therm if a cooking stove is included, and 2d. per therm without a cooker. For the hire of a prepayment meter without fittings the charge shall be 1·5d. per therm or 10 p.ct. per annum on the cost of the meter, whichever is the higher. A minimum charge for prepayment supplies is suggested in the following section:

> Notwithstanding anything in the section of this Act of which the marginal note is "Charge for gas supplied by means of prepayment meters," the Council may charge for gas supplied through a prepayment meter a minimum charge in each quarter (including therein the charges for the hire of any prepayment meter and fittings authorized by the said section) not exceeding 5s.

The calorific value of the gas shall be not less than 500 B.Th.U. A maximum charge of 1s. is proposed for special meter readings.

[*Parliamentary Agents: Messrs. Lewin, Gregory, & Co.*]

READING GAS COMPANY.

The total stock and share capital of the Reading Gas Company, which was incorporated in 1862, is £368,098, of which £337,436 has been issued and fully paid up; and there remains to be issued £30,662 of 5 p.ct. ordinary stock. The amount the Company are authorized to borrow on mortgage or debenture is £155,131; and the whole of this power has been exercised. The growth in the demand for gas renders additional storage capacity necessary; and the Bill is to authorize the Company to provide this on land scheduled, and to raise further capital. Powers are asked for the compulsory purchase of the land referred to; but it is suggested that these powers "shall not be exercised after the expiration of three years from the passing of this Act." It is proposed that the Company shall be permitted to raise additional capital not exceeding in the whole £200,000 (including premiums) by the issue of new ordinary or preference stock. Section 9 of the Bill reads:

> Notwithstanding anything contained in section 11 (limit of dividends on ordinary stock) of the Act of 1902, the limitation of dividends to 5 p.ct. per annum in respect of ordinary capital shall not apply to any capital issued after the passing of this Act under the Reading Gas Acts and Orders, 1862 to 1927; but the Company shall not in any year pay out of their profits any larger dividend on any such capital so issued than at the rate of 6 p.ct. per annum as respects so much of such capital as is issued as ordinary stock, unless a larger dividend be at any time necessary to make up the deficiency of any dividend which shall have fallen short of the said yearly rate.

Borrowing powers up to one-half of the capital are asked; and preference stock or debenture stock to be issued may be redeemable. A maximum charge of 1s. is suggested for special meter readings within the borough; and a maximum of 25s. for any one quarter in respect of stand-by supplies of gas. Clauses are inserted for the specifying of size and material of pipes and fittings and relief from obligation to supply.

[*Parliamentary Agents: Messrs. R. W. Cooper & Sons.*]

SALFORD CORPORATION.

A General Bill to be promoted by the Salford Corporation contains a clause to the effect that any sum payable to the Corporation in respect of the provision of gas, water, or electricity fittings, or the fixing, repairing, or removal thereof shall be recoverable summarily as a civil debt, provided the amount does not exceed £20. Nothing in this section shall prejudice or affect any other right or remedy which the Corporation may have with respect to the recovery of any such sums.

[*Parliamentary Agents: Messrs. Dyson, Bell, & Co.*]

SCARBOROUGH GAS COMPANY.

Many of the provisions of the Special Acts by which the Scarborough Gas Company are controlled have become obsolete or have been superseded; and the areas of local government within which the Company are by those Acts authorized to supply gas have changed. The Company are therefore proposing that the Acts should be repealed, and that such of the provisions thereof as are still in force should be consolidated into one Act, with the amendments and additions contained in the Bill they are now promoting. The Bill proposes that the limits within which the Company may supply gas shall be and include the borough of Scarborough, the urban district of Scalby, and the rural district of Scarborough. If, however, after the expiration of five years from the passing of the Act the Company have not laid down mains for the supply of gas in any parish or part of a parish in the rural district of Scarborough, nothing in the Act shall prevent the local authority of that parish or portion of parish, or any company or person, applying for authority to provide such a supply, and for the repeal of the powers of the Company. The capital of the Company is fixed at £400,000, in various classes of stock. There is to be £186,719 of consolidated ordinary stock, and £49,471 of new ordinary stock—the latter being referred to in the Bill as "the 1895 ordinary stock," as to which it is provided:

> The holders of the 1895 ordinary stock shall be entitled to the like rights, qualifications, and privileges as the holders of consolidated ordinary stock in the capital of the Company,

except that in the event of the undertaking being purchased by the Mayor, aldermen, and burgesses of the borough of Scarborough every holder of any of the 1895 ordinary stock shall be entitled to receive the price at which the amount of that stock held by him was issued by the Company. Every certificate of any of the 1895 ordinary stock issued by the Company shall be endorsed with notice of this enactment.

The 1923 redeemable preference stock shall be redeemed by the Company at par on Oct. 1, 1943; and unissued capital may be offered as consolidated ordinary stock or as redeemable or irredeemable preference stock. The Company seek authority to offer capital for subscription, and to pay a commission not exceeding 5 p.ct. Borrowing powers up to one-half of the capital are asked for. Until Sept. 29, 1927, the price to be charged by the Company for gas supplied by them shall not at any time exceed the sum of 3s. 6d. per 1000 c.ft. to consumers within the borough and 4s. 6d. to those outside. After that date the basic prices shall be 12d. per therm in the borough and 14·4d. outside. The basic dividend on the ordinary capital shall be the rate of 5 p.ct. per annum; and this is the maximum rate fixed for the dividend on the preference stock. The sections governing the division of surplus profits if the price of gas is less than the basic prices, and placing a limitation on the sum carried forward, are in the following terms:

At the end of each year or half-year (if the Company keep half-yearly accounts) after Dec. 31, 1927, a calculation shall be made of the amount (if any) by which the total sum paid or payable by consumers for gas supplied during the year (or half-year) is less than the total sum which would have been payable if the gas within and outside the borough had been charged for at the basic prices for the borough and the area outside the borough respectively. The amount so calculated is in this section referred to as "the consumer's benefit."

If, and so far as, the balance standing to the credit of the net revenue account (after providing for dividend on the preference capital and dividends at the basic rate on the ordinary capital) in the opinion of the Directors permits, a sum not exceeding one-sixth of the consumer's benefit may be applied in the increase of the dividends on the ordinary capital above the basic rates, and if and so far as not so applied shall be carried to the reserve fund to be established under this Act; and it shall be competent for the Company to apply for the benefit of the employees such a share of surplus profits (not exceeding one-sixth of the consumer's benefit) as may be allowed under any co-partnership scheme established under this Act.

Any balance of the profits of the Company not applied as aforesaid shall be left at the credit of the net revenue account and carried forward to the next following year or half-year, subject to the provisions of the [following] section.

It shall not be lawful for the Company to carry forward at the end of any year to the credit of the net revenue account any sum exceeding the total of the following amounts:

(*a*) The amount required by the Company for paying any dividend or interest on moneys borrowed for the purposes of the undertaking which the Company are entitled or required to pay, but have not paid, in respect of that year;

(*b*) The amount required to be applied for the benefit of the employees as aforesaid, but which the Company have not paid, in respect of that year.

(*c*) An amount equal to the total sum which will be required for paying one year's dividends on their preference capital and one year's dividend at the basic rates on the ordinary capital; and

(*d*) An amount equal to the total sum which the Company will be required to pay during the next following year as interest on any mortgages or debenture stock.

There are provisions for the establishment of a profit-sharing scheme, and for the removal of the obligation to prepare half-yearly accounts and hold half-yearly meetings. The qualification of a Director is to be the possession in his own right or in the joint right of himself and another of ordinary or preference stock to the nominal amount of not less than £500. Power is taken for three years to purchase certain lands compulsorily. The calorific value of the gas is placed at 450 B.Th.U. The general provisions are on the most modern lines, and include the sections giving authority to specify size and material of pipes and fittings and to compel repairs in case of danger. A section empowering the Company to demand security for payment of rates reads:

Any person having, or requesting to have, a supply of gas from the Company shall, if and when so required by the Company, and before he is entitled to have any service pipes and meter provided and fixed or to have or continue to have a supply of gas, give to the Company such security for the payment of one year of the rate for the gas to be supplied to him as he and the Company agree on, or as in default of agreement shall be determined in the same manner as by the Gas-Works Clauses Act, 1871, provided for determining the amount of security to be given for the use of meters supplied by the Company; and the Company shall be liable to a penalty not exceeding £5 if they shall discontinue the supply of gas to any person then having a supply unless such person shall have failed to give to them such security for seven days after the same shall have been demanded by the Company.

A charge of 2s. each is named for special meter readings.

[*Parliamentary Agents: Messrs. Torr, Durnford, & Co.*]

(*To be concluded.*)

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Visit to the East Greenwich Works of the South Metropolitan Gas Company.

On Saturday, Jan. 15, the Association visited the East Greenwich Works of the South Metropolitan Gas Company, where, in the unavoidable absence of Mr. Thomas Curr, O.B.E., the Engineer of the Station, they were received by Mr. F. A. Frost, who is Works Manager of the Old Kent Road Works of the Company. Mr. H. D. Greenwood, the Station Chemist, was one of the guides who conducted the visitors over the plant.

The East Greenwich Works are the largest of the Company, and occupy an area of about 150 acres. The site, by the way, was acquired between the years 1881 and 1885; additional land adjoining being purchased in 1900.

Coal Handling.

It was explained to the visitors that the coal is obtained almost exclusively from Durham and Northumberland, and that practically all of it is carried in the Company's colliers, each of which is of about 2200 tons burthen. These ships are berthed alongside a high **T**-shaped jetty, where the coal required for the works, and a large proportion of that required for the up-river stations, is unloaded by four hydraulic cranes fitted with self-acting grabs; each grab having a lifting capacity of 30 cwt. The coal is discharged into storage hoppers which have an aggregate capacity of 173 tons, thus allowing continuous working of the cranes irrespective of any irregularities in the rate at which the coal is drawn away from the hoppers. The coal required for the up-river works of the Company is discharged through chutes from the hoppers into barges. A railway runs under the hoppers, and the coal is transported by trains of fourteen wagons drawn by steam locomotives, each wagon holding 5 tons. On their way to the coal store, the trains pass over a weighbridge placed on the stem of the jetty, where their loads are weighed and recorded. The main railway runs along the upper end of the block of retort houses, and a branch runs into the coal stores in each house. The levels of the rails beneath the hoppers and in the retort houses are the same, thus avoiding any elevation of the coal. Open air storage is available for about 250,000 tons of coal.

Carbonizing Plant.

The proposed lay-out of the retort houses is in blocks of four houses. The first block (Nos. 1, 2, 3, and 4 houses) is complete. Each house is 485 ft. long and 71 ft. wide. The houses are parallel with the river and at right angles to the railway from the jetty. Retort houses Nos. 1, 2, 3, and 4 each contain 45 settings in three benches of fifteen each, with ten horizontal retorts in a setting. The retorts are 20 ft. long and of oval cross-section of 21 in. by 15 in. (inside dimensions). The aggregate capacity of the four houses is 168,000 therms per day, necessitating the carbonization of nearly 2300 tons of coal; and the capacity of each retort house coal store, of which there are seven, is about 6600 tons.

Stoking Machinery.

The stoking machinery in all retort houses consists of Arrol-Foulis chargers and Hunter-Barnett dischargers, all actuated by hydraulic power. The operation of charging occupies an average time of 30 seconds, while that of discharging takes 28 seconds. Each charge consists of about 11 cwt., and the duration of the carbonization is normally ten hours. The retort end temperature at the time of discharge is about 1050° C., while the temperature of the combustion chambers is maintained as nearly as possible at an average of 1330° C. The chargers are fed from overhead hoppers, which are supplied with coal from the crushers by means of bucket elevators. The members of the Association were informed that an average yield of 73 therms of gas per ton of coal carbonized is obtained; the calorific value of the gas being 560 B.Th.U. per c.ft. The chemical and physical characteristics, as well as the quality of the gas made, are rigidly controlled, and the calorific value of the crude gas from each retort house is continuously recorded; adjustments in carbonizing conditions being made as required from time to time, in order to maintain the standard calorific value of the gas supplied.

Producers.

The settings are heated by producer gas generated in step-grate producers built into the base of the settings; and each

pair of producers supplies three settings. The producers are fed with coke direct from the retorts, and are clinkered once every 24 hours. The calorific value of the producer gas is approximately 107 B.Th.U. per c.ft., and it contains 30 p.ct. of carbon monoxide, 2 p.ct. of carbon dioxide, and 5·2 p.ct. of hydrogen. The waste gas contains 19 p.ct. of carbon dioxide and 1 p.ct. of oxygen.

Coke Handling.

The hot coke from the retorts is discharged by inclined chutes to the floor below the retort house, where it is carefully quenched. It is then loaded into wagons and conveyed to store heaps. A proportion of the coke made is elevated to the coke grading plant for separation into five different grades. The average weight of coke made for sale per ton of coal carbonized is 10½ cwt.

Condensers.

The arrangements for condensing created a great deal of interest. The flow of gas from the hydraulic mains is controlled by automatic retort house governors; and recording gauges are used to ensure uniformity of the exhaust. Condensation takes place in a combination of air and water cooled condensers—the air cooling consisting, for each retort house, of a coil of pipe 36 in. in diameter and 1500 ft. long, and the water cooling being carried out in alternate chambers of gas and water, 6 ft. high and 10 in. wide, through which gas and water flow in opposite directions. On No. 4 gas stream these condensers have been replaced by more modern water-cooled condensers placed at the outlet of the exhausters; and a similar unit is in process of erection on No. 3 stream.

Purification.

Inspection of the exhauster house, where there are twelve exhausters driven by six steam engines, was followed by examination of the purifying system. After leaving the condensers, described previously, the gas is passed through Livesey washers, of which there are three to each stream. In these the last traces of tar and a certain proportion of ammonia are removed. An interesting feature is that the washers in each set are placed at different levels, so that the liquor coming from the scrubbers may flow through by gravity, thus saving power for pumping. The gas is then passed through the scrubbers, which are about 60 ft. high, for the final elimination of ammonia. The scrubbers are arranged in sets of two or three, in the last of which clean water is used.

There are five sets of purifiers—one set for each gas stream—and each set consists of four primary and two secondary oxide boxes. The purifiers—which are all of the wet lute type—are 70 ft. long, 30 ft. wide, by 5 ft. deep, and each is charged with about 150 tons of purifying material. The sulphuretted hydrogen is removed in the primary boxes, which are operated on the backward rotation system. In the secondary boxes is removed the sulphuretted hydrogen formed by the decomposition of carbon bisulphide in the catalytic sulphur extraction plant. The decomposition of the carbon bisulphide—as many of our readers will know from previous descriptions of the Carpenter-Evans process—is effected by passing the gas at a temperature of 400° C. over metallic nickel heated to a temperature of 450° C. The reaction is carried out in a series of iron pipes containing the catalyst; the pipes being enclosed in a firebrick chamber heated by producer gas. The carbon bisulphide is decomposed into sulphuretted hydrogen, which is extracted in the secondary purifiers, and carbon, which is deposited on the nickel catalyst. The sulphur extraction plant comprises ten units, each capable of dealing with 8400 therms per day.

Naphthalene Purification.

The naphthalene extraction plant consists of six rotary washer scrubbers, each having a capacity of 38,000 therms per 24 hours. The anthracene oil used is prepared at the Company's Tar Works at Ordnance Wharf, to which it is returned for regeneration after use. Practically every trace of naphthalene is removed in these washers, and the quantity of oil used is about 3·6 gallons per 1000 therms of gas treated. The washers are rotated by Crossley 24 H.P. gas engines.

Gardiner three-cylinder vertical 24 H.P. gas engines drive Sturtevant fans installed for overcoming the resistance to the flow of gas caused by the installation of the later purification processes.

Station Meters and Holders.

There are ten station meters; and these are sunk in concrete tanks below the ground level, to minimize the effects of any variations in atmospheric temperature.

The two gasholders at East Greenwich were designed by the late Sir George Livesey. No. 1 holder has a capacity of 44,800 therms. It was erected in 1885, and has four lifts, varying from 241 ft. to 250 ft. in diameter, each lift being 45 ft. deep.

The larger of the two is No. 2 gasholder. This was built in 1891, and has a capacity of 67,200 therms. It has six lifts, two of which rise above the framing. The waterlogged nature of the ground added considerably to the cost of erection. It was decided to excavate to a depth of 13 ft. only, and to carry the concrete tank 19 ft. above the ground level. As the diameter is 300 ft. and the depth only 32 ft., the holder would be difficult to guide when rising unless special care had been taken in the arrangement of the rollers for the inner lift by providing them tangentially as well as radially.

The gas is distributed from the holders to the other stations of the Company by two trunk mains 48 in. in diameter; and, to maintain an adequate pressure at all parts of the Company's area of supply, centrifugal fans are provided to augment the pressure thrown by the holders. Automatic governors are installed to regulate the pressure exerted by the fans.

Control.

Coal gas only is made by the Company, and, as has been mentioned, its calorific value as supplied is 560 B.Th.U. per c.ft. To maintain the continuous production of gas of the requisite quality and purity, as well as in the interests of efficiency and economy, great care and strict supervision are exercised by the chemical staff at each stage of the manufacturing and subsequent processes. Recording calorimeters and gravitometers are installed to control the calorific value and specific gravity, and daily tests are made to ascertain the inert constituents of the gas and its degree of purity in respect of sulphur and naphthalene. Control is also maintained of retort house temperatures, and tests are made daily of the quality of the producer gas, waste gases, coke, tar, ammoniacal liquor, &c.

General.

The works are adequately equipped with machine-tool, boiler, riveting, blacksmiths', painters', carpenters', and other shops, in which a considerable amount of work is carried out for the other stations of the Company; and the members of the Association were unanimous in their praise of the excellent and replete equipment. There are up-to-date first-aid and dressing stations where first-aid is rendered and all minor injuries are treated; and lobbies and messrooms are provided for the men engaged in all grades of work.

The Co-Partnership Institute is situated by the main entrance of the works; and it was here that, following the inspection, the visitors were entertained at tea by the Company. It is entirely devoted to the workmen's recreations, and is managed by a Committee appointed by themselves. The arrangements include an outer hall for smoking, card-playing, &c., a billiard room, and a large hall with stage, dressing rooms, &c. At the rear of the main building, and connected with it, is a covered rifle range.

Most of the particulars given in the foregoing description of the Greenwich Works are extracted from an illustrated brochure prepared by the Company for the Association's visit. This brochure contained a good deal of information regarding the Company generally; and while it is impossible, on account of space, to include this interesting information here, mention must be made of one fact. Since the Company's co-partnership scheme was instituted in 1889, more than £1,000,000 has been paid to the employees in bonus additions to their regular wages and salaries. In its 37 years of co-partnership, the Company has never had any labour troubles.

Mr. Frost occupied the chair at tea; and after explaining the absence of Mr. Curr, welcomed the Association to the East Greenwich Works, saying what a great pleasure it gave those responsible for the visit to see so many members of the Association present. There was not a great deal of variety in the plant at East Greenwich; but the works were very large—a fact which must have impressed all the visitors—and produced from 50 to 60 p.ct. of the total output of the Company. While the works were designed for an output of 5 million c.ft. a day, they now were capable of producing 7½ millions—and this with practically the same plant. All the retorts were of oval section, and an approximate figure for the output of each retort was 100 therms per 24 hours. The Company believed in the value of standardization.

Mr. Arthur Broadbent (the President of the Association) said it was always a pleasure to visit any of the works of the South Metropolitan Gas Company, for the Company, with the thoroughness which characterized all their operations, spared no pains to make the visits successful in every way. It said a great deal for the efficient control of the plant that a works designed to produce 5 million c.ft. was now capable, without additions, of an output of 7½ millions—an increase of 50 p.ct. Mr. Broadbent said how impressed all had been with the equipment of the workshops. They were sorry that Mr. Curr had been unable to be with them, and they had missed his genial personality; but their thanks were due to Mr. Frost, who was a Past-President of the Association, and to whose good work the Association owed a great deal.

Mr. Leonard Lacey (Senior Vice-President) in proposing a vote of thanks to Dr. Charles Carpenter, the Directors of the Company, and to all who had helped to make their visit such a success, referred to several items which had particularly impressed him during the tour of the works.

The vote was seconded by Mr. M. Walker, of the Lea Bridge Gas Company; and the reply of Mr. Frost terminated the visit.

"Aluminium Facts and Figures."—A useful booklet bearing this title, which explains the contents, has been published by the British Aluminium Company, Ltd., Adelaide House, E.C. 4.

AMERICAN GAS ASSOCIATION.

Notes from Reports and Papers—Fourth Article.

RESEARCH PROBLEMS.

In the course of a paper entitled "Recent Progress in Science in Relation to the Gas Industry," Mr. A. C. Fieldner, Chief Chemist to the United States Bureau of Mines, and Superintendent of the Pittsburgh Experimental Station, says modern investigators have laid the foundation of a new chemistry of coal. They have studied the origin and evolution of coal from the basis of the bio-chemistry of plants and the chemical changes involved in processes of fermentation and decay. Complete knowledge as to the constitution of coal will enable people to answer questions that have baffled the gas engineer for years—as, for example: What are the agglutinating constituents responsible for coke formation, and how determine them? How to blend different coals to make good coke. What is the best carbonizing schedule for a given coal or combination of coals? What is the influence of the carbonizing schedule on the gas and bye-product yields? How control spontaneous combustion? He suggests that investigation of the following research problems should be supported by the Association: (1) The constitution of coal in relation to its carbonization and the products obtained. (2) The physical and chemical properties of coke in relation to its manufacture and use. In connection with this problem, the Association should combine forces with the iron and steel industry. (3) The production of hydrocarbons and alcohols from water gas. (4) The production of cheaper hydrogen and oxygen. The cost of hydrogen is one of the big obstacles in the Bergius process for converting coal to oil, and is a most important factor in synthesizing methanol and ammonia. Likewise much cheaper oxygen would revolutionize the water gas process. (5) The development of heat and corrosion resisting metals. Much progress has been made in recent years in iron-chromium alloys; but no cheap metals are yet available of sufficient strength and durability to withstand the requirements for low-temperature carbonization of coal. (6) Corrosion of metals. Corrosion is one of the most serious menaces to the capital investment of a gas plant and its distributing system. (7) The requirements of gas-works refractories. (8) The rate of heat transfer in tubular condensers from a gas containing water and tar to a metal surface under such conditions that a portion of these substances condenses. (9) Gas purification. Much progress has been made in recent years in acquiring fundamental data on the removal of hydrogen sulphide, naphthalene, and resin-forming constituents; but one does not yet know the exact composition of the organic sulphur and other odoriferous constituents of manufactured gas. A simple exact method for determining small percentages of oxygen in gas is badly needed, in order to reduce corrosion losses from oxygen. (10) Influence of gas composition on combustion and flame characteristics. The growing tendency to blend different gases, such as coal gas, natural gas, oil gas, water gas, and producer gas, calls for a fundamental research, conducted with pure synthetically prepared gases, on the relation between gas composition and flame characteristics. Gravity and B.Th.U. are not the only factors involved.

MASTER METER SUPPLIES.

Further attention has been given by the Committee on Architects and Builders' Service to the so-called "master meter" plan for apartment houses; but since only two companies have made any considerable number of such installations, it is impossible at this stage to publish any statistical results. Some installations have been made in other cities; and several companies are considering adopting the plan. From the figures developed in Chicago, it is, say the Committee, obvious that the installation of a master meter in certain types of buildings—notably the apartment hotel and the furnished one and two roomed apartment buildings—is a very satisfactory arrangement to the owner, the tenants, and the gas company.

The owners figure the cost of gas for the entire building, and include it as a flat figure in the rent, allowing unlimited gas service to the tenants. There is apparently little abuse of this privilege by the tenants, as they are of the "light housekeeping" variety, and the appliances consist largely of small ranges. The free gas service gives the owner a strong argument which appeals to prospective tenants; and the plan in many instances saves considerably on the cost of piping the houses, as separate risers are not required for each apartment. It is believed that the system also tends to prevent the installation of electrical cooking appliances which might otherwise be fitted in these kitchenette apartments. Whether or not the master meter system affects the total amount of gas consumed in the building, has not yet been fully determined.

From the gas company's standpoint, the arrangement is desirable for a number of reasons. The cost of meter reading, billing, collecting, shut-offs, and turn-ons—in fact, all the customer costs—are proportionately reduced. Instead of a large number of small consumers (generally unprofitable), there is but one large consumer, to the advantage of the gas company, without anyone being the loser. Another factor, as mentioned, is the meeting of possible electrical competition.

INCINERATION BY GAS.

As the result of much information collected by the Committee appointed to investigate the subject of incineration by gas, they express the opinion that gas undertakings should be particularly interested in this attractive daily load factor, since the periods of consumption are likely to come in off-peak hours during the day between meal-times. Although the consumption in individual appliances is comparatively small, that of a larger incineration plant—such as apartment houses, restaurants, and hotels instal—offers an excellent field for development, and should lead the way eventually to an appreciable load. The importance of this new development in gas service—which offers great convenience in place of unpleasant conditions, and substitutes clean, sanitary conditions for nauseating sources of germ-breeding—cannot be overrated; and the extension of this service into a heretofore neglected part of the daily life of every gas customer should be a tremendous factor in building goodwill. Along with water heating, house heating, and refrigeration by gas, gas incineration relieves the average customer of one more duty, one more unpleasant task.

SERVICE CHARGE.

In a paper entitled "Unchaining a Market," Mr. Philip Cabot, of the Harvard Graduate School of Business Administration, Cambridge (Mass.), said he had been asked the way to increase the sale of gas in the home. The answer was obvious: Reduce the price of it. It is the author's belief that this can be done without any loss of profit—the margin of which is at present as narrow as can reasonably be expected. Every company, he argued, has a multitude of small customers who do not bear their share of the cost, and statistics indicate that, on the average, two-thirds or more of all domestic customers are in this class. That is, to him, the most significant and the most disturbing fact in sight—all the more so as there is reason to fear that, not only the number, but the proportion of this class is increasing. Now, the loss on these customers must be paid by someone. Time was when it was popular to assume that this loss was borne by the companies, but that is a fallacy which is no longer taken seriously. It is, indeed, now beyond dispute that the losses sustained by serving two-thirds of the customers must be made good by the other one-third. In other words, that one-third of the customers must pay too much, because two-thirds pay too little. If the larger consumers could be relieved of the burden of the small ones, the price of gas to them could be so reduced that they would use more.

The losses referred to are not incurred in the sale of the commodity gas; for the small consumer pays a fair price for the trivial amount he buys. The gas undertakings are losing money on the sale of quite another thing—namely, the gas service which they offer. The secret of success in trade is to have on hand, and price with skill, the goods that customers want to buy; and the seller must know what they want better, sometimes, than they do themselves. The gas business, the author suspects, is suffering from this sort of confusion. Many of the small customers who *say* they want gas, really want *gas service*; and if this is true, the companies' pricing is unskilful. People will pay for what they want; and if they want *service*, why not charge them for it? This service to the small customers costs two or three times as much as the gas they buy (or don't buy), and is the cause of those losses which handicap the undertakings so severely. The service and the commodity have been sold at a combination price—a method which has disguised from both parties to the transaction its economic unsoundness. The service and the gas should be priced separately. The application of the service charge rate to the domestic field has been delayed in the past mainly because it has seemed unwise to raise the bills of such a large number of consumers. Now, however, it can be delayed no longer; for the principle of the service charge rate is fundamental to utility rate making. If it is overlooked, and the price of the commodity is confused with the price of the service, economic errors and injustice to customers will result.

The relation of a public utility to its customer differs from that of every other merchant; for while the customer has a pleasant business acquaintance with his customer, the public utlity is married to him. Both parties are bound for life without hope of divorce. This makes the problem of public relations a major one in the industry, and throws upon the rate-maker a peculiarly heavy responsibility. But the permanence of the tie has the advantage that customers can be classified and dealt with in groups so as to minimize the dangers of injustice; and in defining and maintaining these groups, the service charge rate is invaluable. Three conceptions dominate modern utility rate making—the power of the buyer, the permanence of the connection, and the dangers

of injustice. The service charge rate, with its myriad forms, can harmonize them perfectly.

"Bearing in mind," proceeded the author, "that the purpose of rate making in the domestic gas field is to sell services and goods, that separate prices must be made for each, and that the value to the customer is the most important factor in price fixing in a competitive market, I suggest that you should approach the making of a service charge like a landlord leasing an apartment. The gas company is, in fact, leasing a part of its property to each customer when it makes a contract to furish him service; the gas commodity is quite another matter. Like the owner of real estate, the gas company must lease what the customer wants to hire; but there is no more reason for abating his rent when the thing is not used than for the landlord to do the same when his tenant goes to Florida. If the tenant wants a home, he must pay his rent; and if a gas customer wants a gas service, he must do the same. He is accustomed to this in all other business relations; and he does not object. If his gas rate is properly explained to him, he will pay it. The flat rate under which he pays nothing for the service would seem ridiculous to him, if he understood it. Suppose, for example, that, instead of going to his haberdasher to buy his collars, he should ask the tradesman to bring him a collar at 7 o'clock every morning, on the understanding that if he wanted it he would pay the retail price for it, but if not the dealer could take it home. The proposal is ludicrous; but it is just what he is asking the gas company to do in providing him with a meter, service, and system of gas mains without charge unless he uses gas."

When the property to be leased has been agreed upon, it is vital that the rent charge be correctly calculated. It should be fixed, as other rents are, so as to give a fair return on the present value of the property. In calculating public utility service charges, an error often creeps in at this point; the rental being figured upon the original cost or book value of the property, and not upon the cost of reproduction now. If the charge is based upon past cost in a period when costs are rising, one of two things must happen when extensions for new customers are made—either the new customer is served at less than cost or he must pay more than the old customer. Exactly the opposite happens when costs are falling. Rentals so calculated are unjust, and the only alternative is to base the service charge (or rent for what the customer agrees to hire) on present costs of construction, just as other landlords do.

GLASGOW'S ENTERPRISE.

New Plant at Dawsholm.

Six years ago, the Glasgow Corporation showed foresight and enterprise in taking advantage of the progress in engineering design, by erecting at their Provan Works the largest single installation of continuous vertical retorts in the world, comprising 192 Woodall-Duckham retorts with a total carbonizing capacity of 1356 tons of coal per day. Over 1,500,000 tons of coal have been successfully and economically carbonized in the plant during the past six years.

With the same foresight and enterprise, the Glasgow Corporation, on the recommendation of the Gas Committee, have decided to take advantage of the progress of the last six years by the erection of a new carbonizing plant at Dawsholm on lines strikingly novel and comprehensive.

The scheme at Provan had for its main objective the maximum production of cheap gas with low labour cost and on a minimum ground space. The scheme at Dawsholm also is to make the maximum production of cheap gas with low labour cost and on minimum ground space, and, in addition, coke quality is to be controlled.

To attain this, the Glasgow Corporation Gas Department have accepted the tender of the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., for a comprehensive scheme comprising a combination of W-D continuous vertical retorts and W-D intermittent vertical chambers. The new installation, under regular working conditions, will have a carbonizing capacity of 587 tons of coal per day, and will make 9 million c.ft. of 475 B.Th.U. gas.

Scotch gas coals are, generally speaking, of a comparatively low coking quality. This attribute renders them particularly suitable for obtaining maximum results in continuous verticals. There is, however, the disadvantage that the small material tends to remain in the form of breeze. If suitably blended with caking coal, however, the small material will yield satisfactory coke. The Dawsholm scheme is, therefore, to screen the run-of-mine coal as received, and treat all material above 1 in. in W-D continuous verticals operating under steaming conditions. The material through 1 in. is passed to a further screen, and all below $\frac{3}{16}$ in. is separated. The fraction between 1 in. and $\frac{3}{16}$ in. is washed, and then dried in a Carpenter centrifuge. The washed coal is remixed with the fraction below $\frac{3}{16}$ in., and delivered to storage bunkers. A supply of washed caking smalls is delivered to the works, and a suitable blend of washed run-of-mine coal and washed caking smalls is charged to W-D intermittent vertical chambers, which operate to make high calorific value gas and high-quality coke from the blend. All the coke from the intermittent vertical chamber plant is delivered to screening plant; the fuel for heating both plants being provided by a portion of the coke from the continuous vertical retorts. The carbonizing plant and coal treatment plant are both installed in one house.

The carbonizing plant consists of 44 W-D continuous vertical retorts arranged in two benches, each of 22 103-in. retorts, and 48 W-D intermittent vertical chambers arranged in two benches, each of 24 chambers. The retorts are of the latest type, and are constructed in first-grade silica material. Each retort is independent of the rest. The large retorts give maximum output per sq. ft. of ground space, and have low labour costs. Each bench is heated by a battery of six independent step-grate producers at the side, on ground level.

Each bench of W-D intermittent vertical chambers consists of four independent settings, each comprising six chambers, one recuperator, and one producer. The chambers are constructed of high-grade silica, and the same type of construction is employed as in the vertical retorts.

Three waste-heat boilers are installed, with a total steam-raising capacity of over 28,000 lbs. per hour.

FORTHCOMING ENGAGEMENTS.

[*Secretaries of Gas and Kindred Organizations are asked to assist in making this diary of events as complete and useful as possible by sending the earliest intimation of all meetings.*]

Jan. 20.—MIDLAND JUNIOR GAS ASSOCIATION.—Meeting. Paper by Mr. A. R. Myhill on "Notes on the Operation of Gas Producers."

Jan. 20.—MIDLAND JUNIOR GAS ASSOCIATION.—Meeting in Council House, Birmingham, 6.15.

Jan. 22.—SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT).—Visit to Messrs. R. Laidlaw & Sons, Ltd., Edinburgh.

Jan. 26.—SCOTTISH JUNIOR GAS ASSOCIATION (WESTERN DISTRICT).—Visit to the "Glasgow News and Daily Record" Office.

Jan. 28.—LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.—Meeting at the Westminster Technical Institute. Paper by Mr. A. Hugh Seabrook on "Gas-Works and the Production of Light, Heat, and Power."

Feb. 8.—NATIONAL GAS COUNCIL.—Meeting.

Feb. 8.—FEDERATION OF GAS EMPLOYERS.—Meeting.

Feb. 10.—MIDLAND JUNIOR GAS ASSOCIATION.—Reunion and dinner at the Imperial Hotel, Birmingham.

Feb. 16.—INSTITUTION OF GAS ENGINEERS AND BRITISH COMMERCIAL GAS ASSOCIATION.—Joint Conference on "The Inspection and Maintenance of Consumers' Appliances," at the Institution of Mechanical Engineers, Storey's Gate, S.W.1.

March 9.—JUNIOR GAS ASSOCIATIONS.—Education Conference.

March 16.—BRITISH COMMERCIAL GAS ASSOCIATION.—Midlands District Conference at Smethwick.

April 8.—NORTH BRITISH ASSOCIATION OF GAS MANAGERS.—Annual spring meeting at Dumbarton.

INSTITUTION OF GAS ENGINEERS.

Feb. 8.—Advisory Committee on Education.

Feb. 9.—Emergency Committee, Finance Committee, and Council Meeting.

June 14-17.—Annual General Meeting in London.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Institution of Gas Engineers' Education Scheme.

SIR,—Now that the second half of the session is well on its way, may I remind, through your columns, all who wish to enter for the Institution's examinations in Gas Engineering or Gas Supply, as external students, that their application must reach me not later than the last day of February.

The examination of external students in the Ordinary Grade in Gas Engineering and Gas Supply, and of all in the Higher Grades, and for the written part of the Diploma examination, will be held on Saturday, April 30. (The date of the examination of internal students in the Ordinary Grades in Gas Engineering and Gas Supply is fixed by the technical school or college.)

The Ordinary Grade examination will be of three hours' duration, commencing at 2.0 p.m. and closing at 5.0 p.m. The Higher Grades and the written portion of the Diploma examinations will be divided into two parts of three hours' duration each—from 2.0 p.m. to 5.0 p.m., and from 6.0 p.m. to 9.0 p.m.

The theses of candidates for the Diploma must be sent to the undersigned not later than the last day of March.

Application forms for each of the above examinations, and any further information desired, may be obtained from me.

WALTER HOLE, Organizing Secretary.

Wharfedale, Barton, Torquay, Jan. 14, 1927.

REGISTER OF PATENTS.

Submersible Burners.—No. 261,808.

HAMMOND, C. F., and SHACKLETON, W., both of Victoria Street, S.W. 1.

No. 14,345; June 2, 1925.

This invention relates to improvements in and connected with burners for the combustion of liquid, gaseous, or powdered fuel, and is applicable for use in steam generation, chemical concentration, and other heating operations. The improvements are concerned with burners adapted for immersion in the liquid or body to be heated, so that the liquid or body is heated by direct contact with the gases of combustion. It is desirable that such burners should have a capacity for producing intense heat and attaining a complete combustion of the fuel within the burner. In the event of combustion within the burner being incomplete, combustible particles escape with the gases of combustion into the liquid to be heated, and are instantly cooled by such liquid so that they are wasted and not consumed. It has been realized that it is necessary to provide for the intimate mixing of the air and fuel before reaching the combustion chamber, and to avoid overheating of the mixture. Consequently mixing tubes have been employed not exposed to the high temperature which the combustion chamber must withstand. Also, to prevent overheating or fusing of the materials of which the combustion chamber is made, air jacket cooling has been resorted to.

The object of the present invention is to provide a construction of submersible burner possessing the desirable characteristics above referred to, and capable of producing and maintaining for long periods complete combustion within itself without liability of firing back. A further object is to provide an assemblage of burner parts such as will ensure a maximum degree of safety for those parts, and enable a combustion chamber part, for example, to be exchanged or renewed without difficulty or much loss of time.

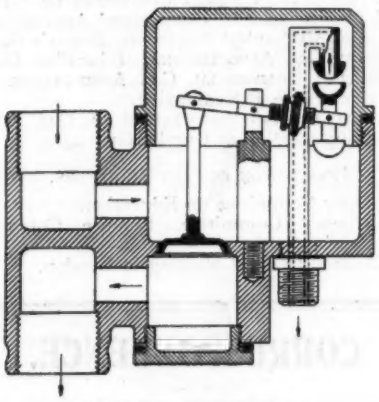
The inventors then proceed in six pages of letterpress and two sheets of drawings to describe how their objects are attained.

Distance Control Apparatus.—No. 262,253.

EDGAR, W. R., of Hammersmith, W. 6.

No. 29,782; Nov. 25, 1925.

This invention relates to the class of distance control apparatus wherein the pilot light is raised or lowered simultaneously with, or immediately after, the extinguishing or lighting (respectively) of a lamp. The invention consists in constructing such an appliance whereby the main valve is connected to the pilot control valve by a rocking lever; the pilot valve, or the rocking lever on the pilot valve side, being slightly heavier than the lever and main valve and its connections. Alternatively, the rocking lever may be provided with adjustable weights.



Edgar's Distance Controller.

The design of the controller is clearly seen in the sectional elevation herewith, from which it will be understood that on establishing the gas supply, which may be through a tap at a distance, the pressure of gas will act upon the main valve and move it from its seating so that the gas can pass to the outlet of the casing and then to the burner. During this movement the main valve has moved the rocking lever and taken the pilot light valve up to its seating; and by the time the main valve has moved its complete distance, the pilot light valve has closed, or nearly closed, and cut off or reduced the pilot light. But this is not done until the gas at the burner has been ignited, there being sufficient time for this.

On turning off the tap, the gas will be cut off, except for the by-pass at the tap; and the pressure being reduced, the adjustable weights, if employed, will move the rocking lever and close the main valve, at the same time opening the pilot light valve.

Ammonium Sulphate Production.—No. 262,320.

STÉ. ANYE. DES FOURS À COKE SEMET-SOLVAY & PIETTE, of Brussels.

No. 9172; April 7, 1926. Convention Date: March 22, 1926.

The claims show that this process for producing ammonium sulphate is characterized by treating with water and pure gaseous ammonia gases resulting from the carbonization or the gasification of fuels; said gases being deprived of their ammonia but still comprising the bulk of their acid impurities. The resulting solution is directly treated with a suspension of finely divided calcium sulphate, freed from its volatile acid constituents, enriched with ammonia, and successively brought into renewed contact with the gases to be purified and with the suspension of sulphate of calcium. After each treatment with sulphate of calcium the solution separated from the precipitate is heated in order to evolve the volatile acids combined with ammonia; the solution then being cooled and re-used for further gas purification.

Charging Horizontal Retorts.—No. 262,625.

MATTHEWS, F. G., of Chertsey, and ALDRIDGE, J. G. W., of Victoria Street, S.W. 1.

No. 2644; Jan. 29, 1926.

In charging horizontal gas retorts with chargers of the swinging push-plate type, a portion of the coal is sometimes pushed off by the upper part of the retort mouthpiece, so that the weight of the charge is diminished. To prevent this, the patentees propose to provide a flared shield or hood which is conveniently supported at the retort end of the apron plate or sliding trough employed for bridging the space intervening between the charging machine and the retort mouthpiece, and over which the charging member and coal pass into the retort.

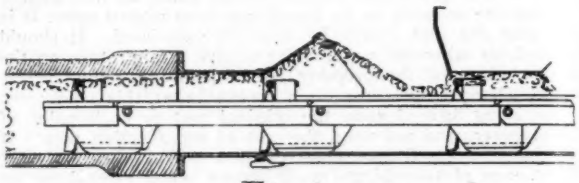


Fig. 1.

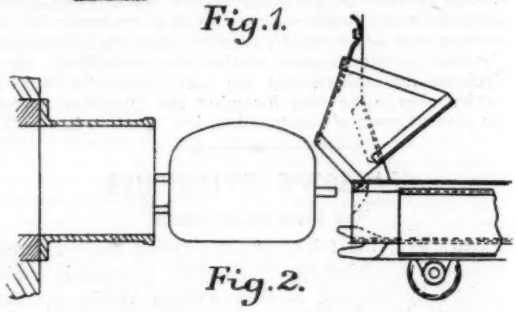


Fig. 2.

A New Feature of the Aldridge Charger.

The shield may be fixed to the apron plate or be pivotally secured thereto; the apron plate being hinged to the machine framing, or being carried on rollers.

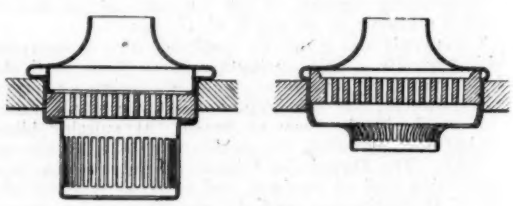
We reproduce two of the drawings, of which fig. 1 is a vertical longitudinal section showing the device in operation during the charging of a retort, and fig. 2 is a conventional side elevation, partly in section, of a pivoted shield as applied to a sliding trough; the shield being shown in the inoperative position.

Teats for Gas Burners.—No. 262,659.

RADIATION LTD., of Birmingham, YATES, H. J., of Grosvenor Place, S.W. 1, and HOWLETT & CO., LTD., of Birmingham.

No. 14,188; June 4, 1926.

This invention combines the features of two known classes of teats for the burners of gas fires, &c.; the object being to minimize the tendency of dust and fluff to accumulate in the teats. For this purpose the invention comprises the employment, in combination, of a



Gas Burner Teats—Radiation Ltd.

transverse grid or perforated baffle arranged immediately below the restricted outlet of the teat, and a depending body part which extends into the interior of the burner tube, is open at its lower end, and may, if desired, be perforated around its side or sides.

Two forms of teat according to the invention are shown in sectional elevation herewith.

Gasholders.—No. 262,622.

CLAYTON, SON, & CO., LTD., and CLAYTON, J., both of Hunslet.

No. 1854; Jan. 22, 1926.

This invention relates to gasholders of the type fitted with spiral guide rails carried by a spiral strip or plate between the thicker side plates at the top and bottom of each lift.

The patentees remark that it has hitherto been customary to make the connection between the spiral plate and the thicker top and bottom rows of side plates in the form of a lap joint or by means of a butt strap on the inside of the holder. In this joint, rivets or bolts are used, which, when the guide rail is in position, are inaccessible. Further, in the case of large holders, the spiral plates are not usually as thick as the top and bottom rows of side plates; this difference necessitating a joggled butt strap to cover the connection, or a thinning-out of the spiral plate in the case of a lap joint.

In view of this, the patentees propose to employ welding; and in carrying the invention into effect, the spiral strip, of a length extending from the bottom edge of the top row of side plates to the top edge of the bottom row of side plates, is placed in or over the slot afforded in the intermediate sheetings, and is welded at its extremities to the adjacent edges of the thicker top and bottom rows—thereby affording a continuous even bed for the spiral rail, and obviating the danger of leakage due to any faulty riveting or bolting. The longitudinal edges of the spiral strip may be riveted to the holder side sheeting in the usual manner.

LEGAL INTELLIGENCE.

MR. GEORGE HELPS'S BANKRUPTCY.

Public Examination.

At the Coventry Bankruptcy Court, on Monday afternoon, before Mr. C. A. Kirby (the Registrar), the public examination of Mr. George Helps, Gas Engineer, of Manor Court, Nuneaton, was commenced.

The summary of debtor's statement of affairs showed gross liabilities amounting to £31,731 10s., of which £25,194 19s. 8d. was expected to rank for dividend, and £809 10s. 4d. for preferential treatment, the balance of £5727 being fully secured. The assets were estimated to produce £86,173; and after providing for the preferential claims, a surplus of £60,168 10s. was shown.

OFFICIAL RECEIVER'S OBSERVATIONS.

The Official Receiver's observations were as follows:

1.—The receiving order was made on Nov. 19 last, on a creditor's petition; the act of bankruptcy being the debtor's failure to comply, before Oct. 18 last, with the requirements of a bankruptcy notice.

2.—The debtor (age 62) resides at Manor Court, Nuneaton, and is in the employ of the Nuneaton Gas Company as Engineer and Manager. He has, it appears, for a number of years been experimenting with processes for the manufacture, distribution, and application of coal gas, and has from time to time obtained Letters Patent in respect of his inventions appertaining to these matters. In June, 1914, a Company, known as Gas Distribution, Ltd., was formed for the purpose of acquiring the business of distributing gas engineers hitherto carried on by the debtor and a Mr. Butler at Nuneaton. In September, 1919, another Company, known as Pleno, Ltd., was formed for the purpose of acquiring the debtor's patents. In both Companies the debtor acquired a considerable number of shares. In May, 1922, the debtor commenced an action against the Corporation of Oldham for an account of royalties alleged to be due to him in respect of the use of some of the inventions referred to, for damages for breach of contract, and for an injunction to restrain the said Corporation from using information given to them by the debtor. The Corporation set up a counterclaim for £4257 9s. 3d., by virtue of a guarantee which the debtor had given in respect of results to be obtained from the use of certain plant invented by the debtor and purchased by the Corporation from Gas Distribution, Ltd. The trial of the action occupied 26 days; and judgment was given on July 28 last in favour of the Corporation, both in respect of the claim and the counterclaim, with costs.

3.—The debtor, it would appear, by agreement dated Jan. 10, 1920, and made between Pleno, Ltd., of the one part and himself of the other part, agreed (*a*) to place at the disposal of, and for the benefit of, the Company the results of his discoveries in relation to the manufacture, distribution, and application of gas, which, it was alleged, were regarded as being of great value and importance; (*b*) for a period of five years from that date to supervise the development of such discoveries for the benefit of the Company. As consideration, the Company agreed to allot to the debtor, as fully paid, 15,000 preference shares of £1 each and 59,999 ordinary shares of £1 each of and in the Company.

4.—The securities held by the creditors scheduled as fully secured are as follows:

(1) Mortgage of two dwelling-houses and a cottage situate in Hinckley Road, Nuneaton—estimated value, £2000.

(2) Mortgage of (*a*) policy of assurance for £1000 on the debtor's life; (*b*) reversionary interest under a will—estimated value of both, £1100.

(3) Mortgage of shares in Pleno, Ltd., to secure a sum of £3100 scheduled as owing to the debtor's wife—estimated value of shares, £44,500.

5.—The unsecured liabilities comprise:

£4,257	0s.	0d.	the amount of counterclaim already mentioned.
£11,934	0s.	0d.	in respect of costs of, and incidental to, the action already mentioned.
£2,687	13s.	3d.	in respect of a bank overdraft.
£5,000	0s.	0d.	in respect of guarantee of bank overdraft of Gas Distribution, Ltd.
£1,023	17s.	10d.	for non-preferential taxes.
£292	8s.	7d.	for printing.
£25,194	19s.	8d.	

6.—The assets shown in the summary above as being estimated to produce £38,475 consist of 6975 £1 shares in Gas Distribution, Ltd., and 31,500 £1 shares in Pleno, Ltd. The book debt from which £5793 is estimated to be realized is scheduled as owing by Pleno, Ltd. It is pointed out that Gas Distribution, Ltd., is in liquidation; while the assets of Pleno, Ltd., are at present in the hands of a Receiver appointed by the Liquidator of the former Company, the owners of the debentures of Pleno, Ltd. It is contended by the debtor that, under certain agreements between the two Companies mentioned and various gas undertakings, very large sums of money are payable by such gas undertakings. Whether or not such contention can be substantiated, it is impossible to predict; but this is the sole foundation for the debtor's estimate of the surplus shown in the summary above. The possibility of the necessity for actions at law in order to enforce the agreements, with all the uncertainty connected with such actions, must not, however, be overlooked.

7.—The household furniture is claimed by the debtor's wife under a settlement made in 1905 in contemplation of marriage. She also claims the patents referred to above, under an assignment executed in 1924 by Pleno, Ltd.

THE EXAMINATION.

At the public examination, Mr. J. J. WILLIAMS represented the Oldham Corporation. It was stated that Mr. F. E. Bendall had been appointed Trustee.

Mr. *Helps*, in answer to the OFFICIAL RECEIVER, stated that he was Manager and Engineer of the Nuneaton Gas Company, and that his salary was based on £5 per million cubic feet of gas. Last year his salary was approximately £700. He had no other income apart from this at the present time. For a number of years he had been experimenting with various processes for the manufacture, distribution, and application of coal gas. He had been doing a lot of research work for fifteen or twenty years. He had been Manager of the Nuneaton Gas Company for 28 years. The Gas Distribution Company was formed about twelve years ago. He could not say from memory what was the capital of this Company. He held 7000 shares; and he believed the capital was £10,000.

The OFFICIAL RECEIVER: Did you pay cash for these shares?

Mr. *Helps*: No.

Did you transfer to the Company the assets of another Company, and in consideration receive the 7000 shares?—I believe that was so.

The OFFICIAL RECEIVER pointed out that the nominal capital of the Company was £20,000, of which £10,000 was issued.

Mr. *Helps*, referring to the Pleno Company, which was registered in 1919, said this Company was formed to deal with patents and agreements. The capital was £100,000, divided into 100,000 £1 shares. He transferred to this Company all his patents and certain agreements which he had obtained; and in consideration he received something like 75,000 or 80,000 shares. He did not receive anything in cash. He was allotted £15,000 worth of preference shares and 59,999 ordinary shares.

The OFFICIAL RECEIVER: In May, 1922, did you commence an action against the Oldham Corporation?

Mr. *Helps*: I do not know whether it was commenced in my name or that of Pleno.

There is no mention on the writ of Pleno?—It got in my name.

It was started in your name and it remained in your name. Judgment was given against you both on the claim and counterclaim?—Yes.

When you commenced these proceedings, what was your financial position?—It is difficult to answer that in a word; but I considered it was an extremely good one. The Companies were then in a prosperous position.

Had either Gas Distribution, Ltd, or Pleno, Ltd., paid any dividend?—No.

Assuming that there was no market for the shares of these Companies, your only means would be your income from the Nuneaton Gas Company?—Yes.

Had you any other capital at that time?—No.

When judgment was given against you, it was your intention to take the case to the Court of Appeal?—Yes. I instructed my Solicitors; but the notice was not given in time, and an application for extension was refused.

Whence were you going to obtain funds to continue the fight?—From friends.

Are there agreements with other corporations and gas undertakings similar to the one made with the Oldham Corporation?—Yes. Continuing, he stated that in May, 1924, various patents were assigned by the Pleno Company to his wife, in return for

£707 2s. 6d., which money was for the purpose of fighting the Oldham Corporation.

According to your statement of affairs, you estimate that upon the realization of your assets you will have a surplus?—Undoubtedly so.

Does that depend entirely upon the value of the shares in Pleno, Ltd., and Gas Distribution, Ltd.?—Yes.

And the value of these shares depends upon whether any sums are recoverable from the gas undertakings with which there are agreements?—I do not think there is much doubt but what they will be collected.

Is there any value in the shares apart from what can be obtained from various companies and corporations?—The value depends mainly upon the agreements.

Mr. *Helps* said the action was supposed to have been brought by Pleno, Ltd. Asked if the Company gave him any indemnity against the costs, he replied that they were so sanguine that they did not imagine a judge would make a "huge blunder" in the case. Expressing his view that the action with the Oldham Corporation was the cause of his present position, the debtor said: "If we had gone to the Court of Appeal, we should have got the judgment reversed. There was a loss owing to delay, for we were 3½ years getting to Court. Business was neglected, and all our attention was given to the case. The case was won by grave misunderstanding." He also said he was looking forward to Oldham paying yet. They (the Oldham Corporation) were saving 40,000 tons of coal in one year. His processes had been adopted in all parts of the world, including America and Japan. Other people were reaping the benefit of his patents. "Agreements are being repudiated; hence my position to-day," he added.

The examination was adjourned until March 14.

WORKMEN'S COMPENSATION ACT CASE.

Commercial Gas Company's Offer.

An extraordinary Workmen's Compensation Act claim was heard in the Bow County Court last Friday, before Judge SNAGGE. Henry Horwood, of Poplar, a coal runner, was the applicant, and the Commercial Gas Company the respondents.

Mr. DUNCAN appeared for the applicant, and Mr. BERRYMAN for the respondents.

Mr. DUNCAN said the application was under the Workmen's Compensation Act, to record an agreement to pay the applicant 30s. a week for the loss of the index finger of the left hand. Due notice for the recording of the agreement was given to the Court; but the respondents were now applying for it not to be recorded—suggesting that the applicant should go back to light work. The accident occurred on June 21 of last year, and no demur was made as to the payment of the 30s. a week for total incapacity until Nov. 19, when the Company suddenly woke up to the fact that the man could do light work, or suggested that he could.

Henry Horwood, the applicant, said he was "firing" at the time when he met with his accident. On the following Friday week he went down to the pay office of the Gas Company, when he was handed 30s. without any comment; and he had been paid that every week since. He had never been offered any light work; and there was no light work to do in the gas-works.

In cross-examination, he emphatically denied that Mr. Williams, the Manager, offered him light work on Nov. 19; and he had no knowledge that letters had passed between his Solicitors and the respondents' Solicitors as to his being offered light work.

Mr. DUNCAN read a letter from the respondents' Solicitors of Jan. 3, in which they offered to allow the agreement to be recorded, if the words "during total incapacity" were added.

Judge SNAGGE: And what was the answer to that?

Mr. DUNCAN: There was no reply.

Judge SNAGGE: But it was a very reasonable suggestion. Surely you do not suggest he is to have 30s. a week for the rest of his natural life?

Mr. DUNCAN said he did not suggest so; but the proper course for the respondents was to have asked for a review, and not for an alteration, of the agreement.

Mr. BERRYMAN pointed out that the agreement asked for made no reference to a diminishing sum when the disablement was partial; and, of course, the Company could not agree to it. If the applicant's advisers would agree to "during total incapacity" going in, the offer—a very generous one—was still open.

Mr. DUNCAN said the agreement was to pay the man 30s. a week; and if the respondents desired an alteration, it was for them to apply under the Act. Nov. 19, the morning they received the documents as to the application for the recording of the agreement, was the first time that there was an alleged offer of light work made to the applicant.

Mr. BERRYMAN: I am now instructed to say that, owing to the charge of "bluffing" on the part of the Gas Company, and the alleged bogus offer of work, my offer as to the addition of "during total incapacity" is withdrawn.

Mr. DUNCAN: Perhaps you will call the Manager, and let us hear what he has to say about this light work.

Mr. *Percy Edwin Williams*, Manager to the respondents, said that on Nov. 19 he made an offer of light work personally to the applicant. There were also offers made by letters to the Solicitors in December. There was still, and always was, light work at the Company's works.

In cross-examination, he indignantly denied that, because there was a request to record the agreement, he made a bogus offer of light work. The man could do light work when he liked, and stay as long as he liked, if he behaved himself.

Judge SNAGGE remarked that, owing to the reflection cast on his clients, Counsel had very naturally withdrawn the generous offer made on behalf of the Company. There was a suggestion that there had been a bogus offer of light work—first, to evade responsibility, and, secondly, because the Company had been asked to record an agreement. He must find that the suggestion was totally unfounded. He thought there were two ways of dealing with this matter. One was to dismiss the application, which would cause a lot of trouble to the workman. The other was to assist the applicant by recording the agreement, adding "during total incapacity;" and he would do that, to protect the workman. In the circumstances, however, he should make no order as to costs for the applicant.

MISCELLANEOUS NEWS.

COMPETITIVE STREET LIGHTING AT BURNLEY.

The Successes of Gas.

The Gas Engineer and the Electrical Engineer of the Burnley Corporation have each submitted tenders for the improved lighting of Arterial Road No. 5—the former for the whole length, and the latter for the lower portion only. The Gas Engineer (Mr. J. H. Clegg) reported that the present lighting was obtained by 170-c.p. lamps spaced at 80 yards, and cost £335 per annum. The Street Lighting Committee of the Corporation have recommended the General Purposes Committee to accept the offer of the Gas Engineer for the improved lighting of this arterial road by 350 400-c.p. lamps of an approved type, spaced at 80 yards, at a cost of £558 per annum.

This is the second competitive scheme in street lighting between the Gas and the Electricity Departments of the Burnley Corporation during the past few months. The first scheme, which covers the whole length of the main tramway route from Brierfield to Padiham—a distance of over three miles—resulted in the Gas Engineer's tender being favourable; but, before deciding, the Street Lighting Committee inspected various systems of 1000-c.p. unit lighting in the main roads, by both electricity and gas, at Manchester and Oldham. As a result of this, they instructed their own Gas Engineer and Electrical Engineer to erect three or four lamps of the type for which they had tendered. These lamps were placed on tramway columns in close proximity in the same road; and after photometric tests were made, the results of the illumination were so close that the Committee were favourably disposed to the acceptance of the Gas Engineer's tender. The Chairman of the Electricity Committee, however, objected to the test, and said that a trial on so small a scale was not conclusive, and that a longer stretch of road should be lighted by each Department before coming to a final decision.

The Electricity Department have therefore erected from the centre towards the Brierfield boundary 34 1000-c.p. lamps; and the Gas Department have erected 34 1000-c.p. high-pressure lamps towards the Padiham boundary. The final inspection by the Committee has not yet taken place; and some local interest has been evinced and speculation aroused as to which is the better lighted section.

As a third attempt to obtain for electricity some portion of the street lighting, the Street Lighting Committee have instructed the Gas Engineer and the Electrical Engineer to submit schemes for the relighting of an estate upon which the Corporation have recently erected a large number of houses. Some portion of this estate is at present lighted by gas; but the Committee are viewing the whole estate as a comprehensive scheme, and require an improved standard of lighting over that which has been formerly adopted for the lighting of less important streets and residential districts.

In each case the policy of the Street Lighting Committee has been to compel the Gas Department to discard existing pillars and lanterns. Thus no advantage accrues to that Department over the Electricity Department in the way of capital expenditure.

EARBY AND THORNTON GAS INQUIRY.

The objections against the application of the Earby and Thornton Gas Lighting Company, Ltd., for a Special Order in connection with the development of their works, were heard at an inquiry conducted at the Earby Council Offices on Thursday, Jan. 13, by Mr. J. F. Ronca, O.B.E. The only objections raised were those against the scheduling of a certain site adjacent to the Company's present premises. Other sites were suggested by the opposition.

Capt. *L. B. Smith* (the Chairman of the Company) showed how Earby had grown since the Order of 1908, and how, after installing a water gas plant as a temporary measure, the Company had been compelled to consider further development. They had been advised not to erect further on their present site, as it was too small, but to put up new carbonizing plant on the adjacent ground. This was

urged more particularly because the most up-to-date part of the present undertaking was on the ground adjoining that sought to be scheduled. The site on which the Company desired to erect their new plant was a good one. It was surrounded on three sides by industrial property. The Directors anticipated that, when the new works were completed, the lower cost of production would enable them materially to reduce the price charged to the consumers. The present retorts used by the Company were horizontal, but in the new works they intended to instal continuous verticals. Witness went on to state why the Company considered sites in other parts of the town to be unsuitable for their project. In some instances the land was too low-lying; in others it was too far away from the present works, was liable to subsidence, or was inaccessible. If the Company had to choose a site on any side of the town, it would involve great expense, because that would mean moving the whole of the present works, or else duplicating part of the plant.

Witness, in answer to questions as to how much the plant they proposed to erect would produce, said that they would be able to make two-and-a-half times as much as their present maximum output.

Mr. *H. W. Kaye* (the Manager of the Company) said that in the last eighteen years the demand had increased from 14 million c.ft. per year to 42 millions. When questioned as to whether they would be able to cope with a similar increase on the proposed site during the next eighteen years, he said they would be able to do so easily.

Mr. *James Mitchell* (the Engineer and Manager of the Nelson Corporation Gas-Works, who is acting as Consulting Engineer for the Earby project) said that the present plant of the Company was producing to its full extent. The works were in a good state of repair, but were wholly inadequate to meet the demand for gas. The available site for the erection of the new works was in a less populated part of the town, and remote from adjoining property. In his opinion it was far more suitable for a new works. From his own experience he had no hesitation in recommending the installation of continuous vertical retorts, from which system of carbonization many advantages accrued.

After hearing the case for the promoters, Mr. Ronca inspected the site sought to be scheduled, and two of the sites suggested by the objecting property owners.

Mr. *John Henry Brearley* (of Southport) was the first witness called on behalf of the opposition. He said that the site sought by the Company was unsuitable for the establishment of a gas-works. It would seriously depreciate the value of many blocks of property adjacent, and would constitute a serious menace, besides being detrimental to the amenities of the immediate neighbourhood. The site had been used as a tip; and owing to a stream on one side, the level of which would also be the level of the water in the sub-soil of the site, the provision of the works foundation would demand extreme care and costliness. He did not agree that the vertical retort would eliminate all nuisance. As an engineer who had erected many gas-works, he was convinced that from the Company's point of view it would be a mistake to adopt this site. The works so established might carry them forward for a few years, but sooner or later they would result in a more perplexing problem than that which faced the Company at present.

Mr. *William Everett* (the Manager of the Ilkley Urban Council Gas-Works), who agreed with the observations of the previous witness, also gave evidence; and after further questioning the inquiry was closed.

GAS REGULATION ACT APPLICATIONS.

SPECIAL ORDER.

South Suburban Gas Company.

To authorize the Company to use scheduled land for gas storage purposes.

NEW SHOWROOMS AT WALLSEND.

Finely appointed and equipped showrooms established in Station Road, Wallsend, by the Newcastle and Gateshead Gas Company were formally opened on Monday by the Mayor of Wallsend (Councillor J. Mason) in the presence of a representative gathering, which included Mr. J. E. Cowen (Chairman of the Gas Company), Mr. T. P. Ridley (Secretary and Commercial Manager), Mr. F. P. Tarratt (Engineer), and members of the Wallsend Town Council. The showrooms are admirably situated in a central position in the town, and are well adapted for giving practical demonstrations in the many uses to which gas can be advantageously applied.

Mr. J. E. COWEN, who presided, said it might have been thought by some people that, when the Newcastle and Gateshead Gas Company took over the undertaking of the Wallsend and Walker Gas Company, Wallsend might be somewhat neglected; but he ventured to think that this idea was not uppermost to-day. He assured the people of the Wallsend district that the Company were determined to give them the best possible service. They recognized that the borough was one in which gas was used in practically every house; and they hoped that their new showrooms would provide every convenience for the public. He referred to the troublesome period of the miners' dispute, and said that the Directors greatly appreciated a letter from the Wallsend Town Council expressing satisfaction that the Company had not raised the price of gas. This was one of the advantages which Wallsend had received through being amalgamated with the Newcastle Company. Regarding the use of gas in industry, Mr. Cowen said that the Company were prepared to give demonstrations at any of their centres and also at their works.

The MAYOR, in declaring the premises open, referred to the enterprise of the Gas Company, and remarked that any question of their taking-over of the local Company's undertaking being detrimental to Wallsend no longer existed. It was gratifying to know that the Newcastle and Gateshead Company did not raise the price of gas during the miners' strike.

The CHAIRMAN presented the Mayor with a silver cigarette case, and the Mayoress with a bouquet.

Mr. J. W. ELLIS (Vice-Chairman of the Company) moved a vote of thanks to the Mayor.

A demonstration of metal cutting by oxy-coal gas proved interesting.

COAL TRADE REPORTS.

From Our Own Correspondents.

NORTH-EAST COAST.

The market continued last week in depressing condition, and closed weak, with general lack of demand. Coking coals were the best section, and seem to have the most promising future, even smalls being in quite reasonable demand. On the other hand, stocks of gas coal everywhere seem to be large, and lack of inquiry for either prompt or forward delivery is causing prices to slip back.

The idea is still being fostered by would-be sellers that, with the cessation of imports from abroad towards the end of next month, considerably better demand will be experienced at home, which will advance prices above the present level. Though this does seem a possibility, the idea is receiving little encouragement either at home or from the Continent, and even cut prices which are quoted by speculators fail to bring in orders.

In Durham coals, Wear Special gas makes are quoted 18s. 6d. to 19s. 6d. f.o.b., and best qualities 17s. 6d. to 18s. 6d. Seconds are 16s. 6d. to 17s.; but these prices can often be discounted for prompt loading. Good Durham unscreened coking can get 18s., and good bunkers are 17s. to 17s. 6d.

Demand is scarcely keeping pace with supply in gas coke, and quoted prices are 23s. to 25s. f.o.b.

YORKSHIRE AND LANCASHIRE.

The comparatively mild weather continues to retard the usual business in household fuels; and industries have not yet recovered. Business is, therefore, far from normal. This is aggravated by the shortage of railway wagons, due to the utilization of so many for the clearance of American and other foreign coal which is still arriving in considerable tonnages—a state of things which may continue until the middle of February. Ships have to be discharged, and as the principal buyers are the Railway Companies, they see that the wagons are available for the clearance of cargoes in which they are primarily interested.

At the moment it is authoritatively stated that many English pits have had to "play" on several days recently, although there is no shortage of fuel for the various needs of the country—house, gas, or steam coals.

Prices fluctuate in accordance with the position at each supplying pit, and as yet there are no stabilized figures.

The following are the Humber bunker and export prices, f.o.b. usual shipping ports: South Yorkshire—Hards, Association, 23s.; washed doubles, 25s. to 25s. 6d.; washed singles, 22s.; washed smalls, 15s.; rough slack, 14s. 6d.; smithy peas, 25s. 6d. to 27s. West Yorkshire—Hartleys (f.o.b. Goole), 21s. 6d. to 24s. 6d.; screened gas coal, 23s. 6d.; washed doubles, 22s.; washed singles, 21s. to 21s. 6d.; washed smalls, 14s.; unwashed doubles, 19s. to 19s. 6d.; coking smalls, 12s. Derbyshire and Nottinghamshire—Top hards, 23s. to 23s. 6d.; washed doubles, 23s. to 24s.; washed singles, 22s. to 22s. 6d.; washed smalls, 14s. to 15s.; rough slack, 13s. to 14s. Yorkshire, Derbyshire, and Nottinghamshire—screened steam coal, 20s.; gas coke, 32s. 6d.; furnace coke, 26s. to 27s. per ton.

MIDLANDS.

Industrialists continue to buy from hand to mouth for the most part. They offer strong opposition to the prices which are being quoted, arguing that they are entitled under the terms of settlement to at least as favourable prices as those which prevailed in April. In the heavy industries it is declared that a trade revival is impossible till fuel is cheaper.

The quarterly meeting of Midland ironmasters at Birmingham has produced little new business; coke and coal being held to be the deterrents. Consumers of iron and steel refuse in very many cases to discuss forward business, believing prices must inevitably come down. This view is shared by producers. Smelters accordingly are in no great hurry to blow-in furnaces with coke firm at 20s. at the ovens. Some plants which have assured outlets for their production would be recommissioned, but supplies are too insecure. Two additional furnaces are being lighted in Northamptonshire, and two in Lincolnshire.

In special cases coal contracts are being renewed at a very small advance on prices ruling in the first quarter last year. Commonly collieries adhere to quotations 1s. 6d. to 2s. 6d. above those rates. Smalls have been characterized by less stringency. Spot lots of D.S. nuts have been sold at 12s. to 14s.; while some slacks have changed hands at 10s. to 11s.

The house-coal trade is brisk. There is a continuous demand for the better grades to replenish stocks. Transport has been working more freely; wagons which had been withdrawn for Christmas traffic having been restored to mineral service.

Reduction in Price at York.—The Directors announce a reduction of 2d. a therm in the price of gas, making it 8d. a therm. The reduction will take effect as from the December quarter ordinary meter readings, and as from the completion of the December quarter clearing of prepayment meters now in progress. The price before the strike was 7¾d. per therm; and the first increase—to 8¾d.—took place from the September readings of the meters, and the second—to 10d.—on Nov. 8.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Jan.* 17.

There is very little to record in the tar products market this week.

Some business has been done in pitch, and the price remains at about 130s. net per ton f.o.b. Thames.

Creosote is quite steady at 9d. to 9¼d. net per gallon, and very little oil is available over the next few months.

White spirits continue in good demand at the prices last reported.

There is no change in the prices of pyridine and crystal carbolic acid.

Tar Products in the Provinces.

Jan. 17.

The market for pitch is a little firmer owing to recent purchases to cover sales made at higher prices during the coal strike.

Creosote is still in good demand, and the quantity available for fresh business appears to be small.

Other products remain unchanged.

The average values for gas-works products during the week were: Gas-works tar, 88s. 6d. to 93s. 6d. Pitch, East Coast, 120s. to 125s. f.o.b. West Coast—Manchester, 115s. to 120s.; Liverpool, 117s. 6d. to 122s. 6d.; Clyde, 120s. to 123s. 6d. Benzole, 90 p.ct., North, 1s. 9¼d. to 1s. 10¼d.; crude, 65 p.ct. at 120° C., 1s. 3d. to 1s. 4d., naked at makers' works; 50-90 p.ct., naked, North, 1s. 10¼d. to 1s. 11¼d. Toluole, naked, North, 1s. 9d. to 1s. 10d. nominal. Coal-tar crude naphtha, in bulk, North, 9d. to 9¼d. Solvent naphtha, naked, North, 1s. 7d. to 1s. 8d. Heavy naphtha, North, 1s. 1d. to 1s. 2d. Creosote, in bulk, North, liquid, 8¼d. to 8¾d.; salty, 8d. to 8¼d.; Scotland, 8d. to 8¼d. Heavy oils, in bulk, North, 8¾d. to 9d. Carbolic acid, 60 p.ct., 1s. 9¼d. to 1s. 10¼d. prompt. Naphthalene, £11 to £14; salts, 100s. to 110s., bags included. Anthracene, "A" quality, 2¼d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

TRADE NOTES.

The Morris Runway.

Messrs. Herbert Morris, Ltd., of Loughborough, recently published a booklet on a special type of overhead runway capable of erection by any mechanic. Though there was a large edition, it was quickly exhausted; and in response to the widespread demand, the firm have prepared a new edition, containing 75 p.ct. of new material. Our readers will doubtless be interested to see the booklet.

W-D Installation for Hinckley.

The Hinckley Urban District Council Gas Department have placed an order with the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., for a second installation of continuous vertical retorts. The installation consists of a bench of three settings, each comprising four 6-in. retorts and one producer. The plant will have a carbonizing capacity of 60 tons of coal per day. The contract includes all coal and coke handling machinery. The first installation of W-D vertical retorts at Hinckley was put to work in the autumn of 1923, since when the whole of the gas for the town has been provided by these retorts.

British Typewriters.

The manufacture of machinery for lace-making is a highly skilled and technical industry. It is partly, no doubt, attributable to their experience in this direction that the firm of Messrs. John Jardine, Ltd., have been so successful in embarking on the manufacture of typewriters. Since they took over the Barlock factory at Nottingham, the output has increased till the only difficulty now is to keep pace with the demand. In an industry which has for so long been almost the monopoly of America, this is highly satisfactory, for the whole construction of this well-known machine is British from start to finish. More enterprise and adaptability of this kind by British manufacturers would mean a large reduction in the figures for unemployment.

CONTRACTS OPEN.

Tar.

The Directors of the Slough Gas and Coke Company invite tenders for the purchase of their surplus tar. [See advert. on p. 157.]

Pipes, &c.

The Gas and Water Department of the Clacton Urban District Council invite tenders for the supply of cast-iron pipes and specials. [See advert. on p. 157.]

Tenders are invited by the Gas Committee of the Marple Urban District Council for the supply and delivery of cast-iron, spun, or steel pipes, and specials. [See advert. on p. 157.]

Imperial Chemical Industries, Ltd.—The Directors of Imperial Chemical Industries, Ltd., announce that allotment letters have been posted in respect of transfers in order received at the registered offices of Brunner Mond & Co., Ltd., Nobel Industries, Ltd., the United Alkali Company, Ltd., and British Dyestuffs Corporation, Ltd., up to Dec. 31. Further batches of allotment letters will be posted at approximately weekly intervals. The acceptances to date of the offer to exchange shares have been entirely satisfactory; shareholders representing over 80 p.ct. of the ordinary shares in each Company having agreed, and the acceptances from the other classes of shareholders being equally satisfactory. In response to numerous requests from shareholders abroad and others who are prevented from completing the necessary formalities immediately, the Directors of Imperial Chemical Industries have decided to keep the offer open for a reasonable time beyond the date (Jan. 15) named in the circulars to the shareholders.

Lectures to Outdoor Staff at Sheffield.

During each winter season since 1923 a series of fortnightly lectures has been given to the outdoor staff of the Sheffield Gas Company. The papers at these lectures are usually contributed by members from each section of the undertaking; and the results have proved most beneficial to all concerned. As a departure from the general rule, Mr. A. Forshaw, M.Sc., Chief Chemist to Messrs. R. & A. Main, Ltd., delivered a most interesting lecture at the Chief Showrooms, High Street, on Thursday, Jan. 13. He dealt with many aspects of gas cooking appliance construction, with special reference to the "Conservor" oven. At the end of his lecture an interesting collection of lantern slides was shown. At the conclusion of the meeting, Mr. Ralph Halkett (General Manager and Secretary to the Company) expressed the joint appreciation of the management and employees to Mr. Forshaw for his instructive address.

Company Registrations in 1926.—Messrs. Jordan & Sons, of Chancery Lane, W.C., have compiled their usual classified table of company registrations during 1926. This shows that there were 244 gas, electricity, and water companies registered in the course of the year, with a combined capital of £2,537,406.

Issue of Stock in the North Middlesex Gas Company.—The Directors of the Company have authorized Messrs. A. & W. Richards to offer for sale by tender £30,000 6 p.ct. irredeemable preference stock—the minimum price of issue being par. The new capital is required for extension of the works, mains, &c., rendered necessary by the constantly increasing demands for gas. Tenders should arrive at Messrs. Richards, 37, Walbrook, E.C. 4, not later than eleven o'clock on Friday, Jan. 28.

Gas Display in Leeds.—At a Building Trades Exhibition which is being held in the Drill Hall, Fenton Street, Leeds, the Leeds Corporation Gas Department have an attractive stand. The exhibits include labour-saving, heating, and cooking appliances, and gas fittings. There are gas fires with suitable tiled surrounds, and gas mantel registers for bedrooms. Two white glazed recesses show heating and cooking appliances; the hot water supply being obtained in one case from a gas heated circulator, and in the other by a coke fired boiler. A modern scullery includes gas cooker, wash boiler, and multi-point geyser; the latter supplying hot water to the bathroom as well as the sink. Two methods of fixing geysers to flues are demonstrated—one through a wall, and the other through the roof.

The "L & N" Low-Temperature Process.—We are informed by Sensible Heat Distillation, Ltd., 100, Victoria Street, Westminster, S.W., that a Company has been formed with a capital of £250,000 for the purpose of acquiring from Sensible Heat Distillation, Ltd., the British rights of the "L & N" process for the distillation of coal. The name of the new concern is L & N Coal Distillation, Ltd., the Joint Managing Directors of which will be Colonel J. T. C. Moore-Brabazon, D.S.O., who has resigned his position as Parliamentary Secretary to the Ministry of Transport, in order to accept his new appointment, and Major Laing, Managing Director of Sensible Heat Distillation, Ltd., who has, himself, provided all the funds for many years necessary to perfect the process and erect the required plant at Barnsley and elsewhere. We are informed that Colonel Moore-Brabazon and Major Laing will be Joint Managing Directors of both L & N Coal Distillation, Ltd., and Sensible Heat Distillation, Ltd.

We are informed by Mr. W. E. Cone that the address of the British Road Tar Association is now: 17, Grosvenor Gardens, London, S.W. 1. Telephone: Victoria 7709.

The Torrington Board of Guardians, considering that the lighting of their institution by means of oil lamps is antiquated, have appointed a Committee to report upon the question of installing gas.

At Lytham St. Annes, on Jan. 13, a low-pressure gas main became severed, and the gas was ignited. A subsidence in the road was responsible for the occurrence. The fire brigade were summoned, and played on the high-pressure main to keep it cool while the gas supply in the broken main was cut off.

Failure of an electricity main radiating from a sub-station in the Cookridge Street area of Leeds, shortly after 10 o'clock on the night of Jan. 11, deprived an area in the centre of the city of electric light for some time just as theatre audiences were dispersing. For about ten minutes the supply to part of the General Infirmary was cut off.

The Morecambe Corporation Gas Department's part in maintaining an excellent light and fuel supply throughout the seven months of the coal strike has been the subject of an appreciative article, nearly a column in length, in the local newspaper. The Gas Department rose to the occasion by inserting a half-page display advertisement of gas and gas appliances.

The Staff Dance of the Le Bas Tube Company, Ltd., was a most enjoyable function. It was held at Slater's Restaurant on Saturday evening, Jan. 8; and with the help of a popular dance band, 66 couples enjoyed two hours dancing before supper, which was served at 9 o'clock. The social atmosphere was not diverted in any way by speeches or toasts; and as soon as supper was concluded, the dancers took the floor again.

The new prices for gas to become operative at Bradford with the adoption of the therm method of charging (recently approved) are: Consumers within the city, for ordinary purposes, 11d. per therm; industrial purposes, 9·6d. Outside the city, Clayton, Wilsden, and Denholme, ordinary, 12·6d.; industrial, 11d. Scholes, Oakenshaw, Shelf, Hunsworth, and Clifton, ordinary, 13d.; industrial 11d. For gas through prepayment meters, the ordinary rates are increased by 1·4d. per therm. The existing scale of discounts remains in force.

STOCK MARKET REPORT.

ALTHOUGH there was no outstanding feature on the Stock Exchange last week, brighter conditions prevailed. In the absence of any important new issues, transactions were much more numerous, and prices generally were on the up grade. Following on the success of the recent conversion scheme, British Government securities were slightly higher; War Loan, Victory Bonds, and Funding Loan being most prominent. A fair business was done in Colonial and Corporation issues. Ealing 5 p.c. rose to 2¾ premium, and Nottingham 5 p.c. to 2⅛ premium.

In the Foreign Market there was a further improvement in Belgian 7 p.c. to 104¼; and European reconstructions, with the exception of Germans, all advanced. It is a curious fact that though the position in China cannot be said to have improved and the anxiety with regard to British interests continues, the effect on Chinese securities was almost negligible; there was even a slight recovery towards the close of the week. In the Industrial Market there was considerable activity.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. Jan. 14.	Rise or Fall on Week.	Transactions. Lowest and Highest Prices.
£			%p.a.	% p.a.				
171,978	Stk.	Aug. 12	5	5	Aldershot 5 p.c. max. C.	72—75	..	..
‡822,992	,,	,,	4	4	Do. 4 p.c. Pref.	67—72	..	..
1,551,868	,,	Sept. 30	6½	6½	Alliance & Dublin Ord.	80—85	..	81¼—83 7/16
874,000	,,	Jan. 13	4	4	Do. 4 p.c. Deb.	65—68*	−2	67⅛
900,000	1	Oct. 14	1/7½	1/7½	Bombay, Ltd.	1—1½	.	21/6
170,000	10	Aug. 26	8½	8½	Bournemouth 5 p.c.	12—13	..	12⅜—12⅝
600,050	10	,,	7	7	Do. B 7 p.c.	12—13	..	£12 11/—12⅝
275,000	10	,,	6	6	Do. Pref. 6 p.c.	11—12	..	11⅛
50,000	Stk.	Jan. 13	3	3	Do. 3 p.c. Deb.	53—56*	−1	..
182,025	,,	,,	4	4	Do. 4 p.c. Deb.	73—76*	−1	74⅜
214,740	,,	Aug. 26	12	12	Brighton & Hove Orig.	163—168	..	..
344,200	,,	,,	9	9	Do. A Ord.	125—130	..	..
1,287,500	,,	July 22	5	5	Bristol 5 p.c. max.	84—85a	−½	..
855,000	,,	Sept. 30	7	8	British Ord.	102—107	..	105½
100,000	,,	Dec. 30	7	7	Do. 7 p.c. Pref.	112—117	..	..
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	68—73	..	..
100,000	10	Dec. 9	8	6	Cape Town, Ltd.	7—8	..	..
100,000	10	Oct. 28	4½	4½	Do. 4½ p.c. Pref.	6—7	..	..
150,000	Stk.	Dec. 30	4½	4½	Do. 4½ p.c. Deb.	68—73	..	..
696,860	,,	July 22	6	6	Cardiff Con. Ord.	97—100	..	..
287,860	,,	Dec. 30	7½	7½	Do. 7½ p.c. Red. Deb.	100—103	..	..
157,150	,,	Aug. 12	6½	5	Chester 5 p.c. Ord.	89—94b	..	..
79,185	1	Sept. 30	†2/-	†2/-	Colombo Ltd. Ord.	27/—29/-	..	..
24,495	1	,,	1/4½	1/4½	Do. 7 p.c. Pref.	20/—22/-	..	..
321,490	1	Oct. 14	1/9⅜	1/7½	Colonial Gas Assn. Ld. Ord.	25/—27/-	..	26/3
173,900	1	,,	1/9⅜	1/7½	Do. 8 p.c. Pref.	21/—23/-	..	..
1,513,280	Stk.	Aug. 1	5½	5½	Commercial 4 p.c. Cap.	81—84	+2	81¼—83
580,000	,,	,,	5/8/4	5/8/4	Do. 3½ p.c. Cap.	80—83	+2	79¼—82
475,000	,,	Dec. 30	3	3	Do 3 p.c. Deb.	54—57	..	..
800,000	,,	Sept. 30	§2	§1	Continental Union, Ltd.	28—33	+1	..
200,000	,,	,,	7	7	Do. 7 p.c. Pref.	82—85	..	..
787,150	,,	Aug. 12	6½	6½	Croydon sliding scale	96—99	..	..
408,160	,,	,,	5	5	Do. max. div.	78—81	..	80—80½
492,270	,,	Aug. 26	9	6	Derby Con.	107—109c	..	..
55,000	,,	Dec. 30	4	4	Do. Deb.	73—75c	..	..
209,000	,,	Sept. 16	5	5	East Hull Ord. 5 p.c.	78—82	..	..
50,000	,,	Dec. 30	5	5	Eastbourne 5 p.c. Deb.	90—95	..	..
1,002,180	10	Sept. 30	†4	†3	European, Ltd.	6¼—7¼	..	6¼—6 13/16
18,788,960	Stk.	Aug. 12	4/17/4	5/1/4	Gas Light & Coke 4 p.c. Ord.	86—88	..	86—87⅛
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	59—62	+1	60¼—61⅛
4,187,020	,,	,,	4	4	Do. 4 p.c. Con. Pref.	75—78	+1	76¼—77⅛
5,602,620	,,	Dec. 30	3	3	Do. 3 p.c. Con. Deb.	57—60	..	58—59⅛
181,315	,,	,,	—	6	Do. 6 p.c. Br'tf'd Rd. Db.	100—105	..	101—101½
130,000	,,	—	10	10	Do. 10 p.c. Bonds.	..	..	..
42,000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Aug. 26	6½	6½	Hastings & St L. 5 p.c. Conv	87—92	..	..
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	66—71	..	..
70,000	10	Oct. 14	†10	†10	Hongkong & China, Ltd.	14⅜—15⅛	..	..
173,200	Stk.	Sept. 16	5	5	Hornsey Con. 3½ p.c.	69—71	..	..
1,976,000	,,	Nov. 11	†10	10	Imperial Continental Cap.	131—134	+1	131½—132½
226,170	,,	Aug. 12	3½	3½	Do. 3½ p.c. Red. Deb.	68—71	..	68¼—70
235,242	,,	Aug. 12	6½	6½	Lea Bridge 5 p.c. Ord.	94—99	..	95½—96
2,127,340	,,	Aug. 12	5½	5½	Liverpool 5 p.c. Ord.	79—79½b	−½	..
600,000	,,	Sept. 30	7	7	Do. 7 p.c. Red. Pref.	102—105b	..	..
165,786	,,	Aug. 26	8	9	Maidstone 5 p.c. Cap.	113—117	..	112—113
63,480	,,	Dec. 30	3	3	Do. 3 p.c. Deb.	52—57	..	..
75,000	5	Dec. 9	†7	†7	Malta & Mediterranean	5½—5¾	..	..
541,920	Stk.	Nov. 25	†6	†5	Montevideo, Ltd.	79—83	..	81
2,061,315	,,	Aug. 12	5	5	Newcastle & Gateshead Con.	70¾—71¼d	−¾	..
360,929	,,	,,	4	4	Do. 4 p.c. Pref.	70—72d	−2½	..
529,705	,,	Dec. 30	3½	3½	Do. 3½ p.c. Deb.	67¼—67¾d	−⅛	..
15,000	,,	Aug. 26	11½	11½	North Middlesex 10 p.c.	155—160	..	..
91,580	,,	,,	8 5/16	8 5/16	Do. 7 p.c.	109—114	..	..
800,000	,,	Nov. 25	7	9	Oriental, Ltd.	97—102	..	..
188,120	,,	Dec. 30	7¾	7¾	Plym'th & Ston'house 5 p.c.	105—110	..	107¼—110
414,500	,,	Aug. 26	—	7/4/0	Portsm'thCon.Stk.4p.c.Std.	102—107	..	..
236,732	,,	,,	—	5/0/0	Do. 5 p.c. max.	78—81	..	..
2,389,909	1	—	—	—	Primitiva Ord.	14/—15/-	+/-/8	14/—14/6
282,200	100	Dec. 1	4	4	Do. 4 p.c. Red. Deb.	84—86	..	85
600,000	Stk.	July 22	4	4	Do. 4 p.c. Red. Deb. 1911	70—72	..	..
434,963	,,	Dec. 30	—	4	Do. 4 p.c. Cons. Deb.	69—71	..	..
150,000	10	Sept. 30	6	6	San Paulo 6 p.c. Pref.	7½—8	..	..
125,000	50	July 1	5	5	Do. 5 p.c. Red. Deb.	47—50	..	..
270,000	Stk.	Sept. 16	6	5½	Sheffield A	96—98e	..	..
419,968	,,	,,	6	5½	Do. B	96—98e	..	..
1,047,000	,,	,,	6	5½	Do. C	96—98e	..	..
90,000	10	June 11	4	—	South African	4—6	..	..
4,809,895	Stk.	Aug. 12	7	5	South Met. Ord.	94—96	..	94—95⅞
1,895,445	,,	Jan. 13	3	3	Do. 3 p.c. Deb.	56—59*	−1	59
734,000	,,	Sept. 16	6½	6½	Do. 6½ p.c. Red. Db.	100—102	..	101½
91,500	,,	Aug. 12	8½	8½	South Shields Con.	114—116d	..	..
1,187,795	,,	Aug. 12	6½	6½	South Suburban Ord. 5 p.c.	97—100	..	98½
368,897	,,	Dec. 30	5	5	Do. 5 p.c. Deb.	93—96	..	..
647,740	,,	Oct. 14	5	5	South'mpton Ord. 5 p.c.max.	75—78	..	76¼
121,275	,,	Dec. 30	4	4	Do. 4 p.c. Deb.	68—73	..	70
350,000	,,	Aug. 26	7	7	Swansea 7 p.c. Red. Pref.	100—102	..	..
200,660	,,	Dec. 30	6½	6½	Do. 6½ p.c. Red. Deb.	100—102	..	..
120,000	,,	July 22	7½	7½	Tottenham District A 5 p.c.	105—110	..	..
882,275	,,	,,	5½	6½	Do. B 3½ p.c.	89—92	+1	90½—91
150,000	,,	,,	5½	5½	Do. 5½ p.c. Pref.	99—101	..	..
181,255	,,	Dec. 9	4	4	Do. 4 p.c. Deb.	72—75	..	..
258,251	,,	Aug. 26	5	5	Tynemouth Con. and New	69½—70¼d	..	..
197,294	,,	Aug. 26	6½	6½	Uxbridge, Maidenhead, & Wycombe 5 p.c.	85—90	..	..
88,330	,,	,,	5	5	Do. 5 p.c. pref.	80—85	..	..
91,800	,,	,,	6½	6½	Do. 5 p.c. Maidenh'd	85—90	..	..
					Wandsworth, Wimbledon, and Epsom—			
80,000	,,	July 8	8½	8½	Wandsworth A 5 p.c.	122—127	..	..
255,636	,,	,,	7	7	Do. B 3½ p.c.	102—107	..	..
412,450	,,	,,	5/19/0	5/19/0	Do. C and New	88—93	..	..
852,000	,,	,,	6§	6§	Wimbledon 5 p.c.	98—103	..	..
98,000	,,	,,	7½	7½	Epsom 5 p.c.	104—109	..	..
88,416	,,	Dec. 30	3	3	3 p.c. Deb.	54—57	..	..

Quotations at:—a.—Bristol. b.—Liverpool. c.—Nottingham. d.—Newcastle. e.—Sheffield. *Ex. div.
† Paid free of income-tax. ‡ Plus 8½ p.c. p.a. special dividend. § For year.

In a modified degree Gas Stocks also made progress. The Commercial Company's two stocks were marked up 2 points, and Tottenham "B" 1 point. Primitiva ordinary continues to improve, and is now quoted at 14s.—15s., which in the absence of any dividend is remarkable. This price compares with 12s. 6d.—13s. 6d. a year ago. Continental Union and Imperial Continental capital stocks also advanced by 1 point. British 5 p.c., Newcastle ordinary, and Liverpool 5 p.c. had small set-backs at the local Exchanges.

The following transactions were recorded during the week:

On Monday, Alliance and Dublin 81¼, 82, Bournemouth 7 p.c. 12⅜, Bristol 5 p.c. 83½, 84, Commercial 3½ p.c. 79½, European 6 1/16, Gas Light and Coke 86, 86¾, 87, 87⅛, 87⅜, 3½ p.c. 60¾, 4 p.c. preference 76¼, 77, 77½, 3 p.c. debenture 58, 59½, Imperial Continental 131½, Maidstone 5 p.c. 112, Plymouth and Stonehouse 107¼, Primitiva 14s., 14s. 1½d., 14s. 3d., 14s. 4½d., South Metropolitan 94, 95, 95⅛, 95¼, 3 p.c. debenture 59, South Suburban 5 p.c. 98½. Supplementary prices, Croydon 6 p.c. debenture 98, 98½, Gas Light and Coke 5 p.c. debenture (int. from Sept. 1, 1926), 99¼.

On Tuesday, Alliance and Dublin 82, 82¾, Bournemouth 5 p.c. 12⅛, 12⅜, "B" £12 11s., £12 13s. 6d., 6 p.c. preference 11¼, Commercial 4 p.c. 82, 82½, Gas Light and Coke 86⅞, 87¼, 87⅜, 87½, 3½ p.c. maximum 61½, 4 p.c. preference 76½, Imperial Continental 131¼, 131⅜, 132½, 3½ p.c. debenture 68¼, 69½, Maidstone 5 p.c. 113, Plymouth and Stonehouse 5 p.c. 110, Primitiva 14s. 1½d., 14s. 4½d., South Metropolitan 94½, 95, 95⅛, Tottenham 3½ p.c. 90½, 91, Tuscan 20s. Supplementary prices, Bournemouth new 6 p.c. preference 11¼, Hornsey 4 p.c. debenture 71½, Woking 10 p.c. "A" 79, 79½.

On Wednesday, Alliance and Dublin 83, 83 1/16, Bournemouth 6 p.c. preference 11¼, British 105¼, Colonial 26s. 3d., Commercial 4 p.c. 83, Croydon maximum dividend 80, 80½, Gas Light and Coke, 86⅞, 87⅛, 3½ p.c. maximum 60¼, 3 p.c. debenture 58½, 59½, Lea Bridge 95¼, 96, Primitiva 14s. 2¼d., 14s. 3d., South Metropolitan 95, 6½ p.c. debenture 101½. Supplementary prices, Hornsey 4 p.c. debenture 72½, Montevideo 6 p.c. debenture 97¾, 98¼.

On Thursday, Bombay 21s. 6d., Commercial 4 p.c. 81½, 3½ p.c. 80½, 81, 82, European 6¼, Gas Light and Coke 86¾, 87, 87¼, 87⅜, 87½, 3 p.c. debenture 58½, 59½, Imperial Continental 3½ p.c. debenture 69, 70, Lea Bridge 95¼, 96, Montevideo 81, Primitiva 14s. 1½d., 14s. 3d., 14s. 4½d., 14s. 6d., 4 p.c. 1st debentures 85, South Metropolitan 95¼, South Suburban 5 p.c. 98½. Supplementary prices, Bournemouth new 6 p.c. preference 11¼, Gas Light and Coke 5 p.c. debenture 99½.

On Friday, Alliance and Dublin 83, 4 p.c. debenture 67½, Bournemouth "B" £12 12s., 12⅜, 4 p.c. debenture 74¾, European 6 1/32, Gas Light and Coke 86¾, 86⅞, 87, 87¼, 87⅜, 3 p.c. debenture 58, 58¾, 6 p.c. Brentford debenture 101, 101½, Montevideo 81, Primitiva 14s. 3d., 14s. 5¼d., 14s. 6d., South Metropolitan 95, 95⅛, 95⅛, 95¾, Southampton 5 p.c. 76¼, 4 p.c. debenture 70, Tottenham "B" 91. Supplementary prices, Gas Light and Coke 5 p.c. debenture 99½, Swansea 5 p.c. maximum 83.

In Lombard Street discount rates were weak. The downward tendency was accentuated by the low rate at which Treasury Bills were allotted. Only £35,000,000 were offered, and were allotted at £4 3s. 4·65d. p.c., or 3s. 1d. p.c. below the rate for the previous week. Money was plentiful, and borrowers towards the close were able to obtain balances at as low as 3 p.c. An early reduction in the Bank Rate is foreshadowed.

On the Foreign Exchange Market French francs remained steady, the Paris cheque closing at 122.15. Italian lire made some progress on reported official support, and the Milan rate closed at 110⅞. Belgas were steady at 39.90½; but the German rate moved against this country, and finished at 20.45. The dollar sterling was slightly firmer at 4.85 13/32.

Silver improved on Chinese support, and closed at 25⅜d. per oz. There were no Gold movements at the close of the week, and the price remained at 84s. 11½d. per oz.

The Bank Rate is 5 p.c., to which it was raised from 4 p.c. on Dec. 3, 1925. Bankers' deposit rates are 3 p.c. The deposit rates of the discount houses are 3 p.c. at call and 3¼ p.c. at notice.

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